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Energy Conservation

a service-learning resource package

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ENERGY CONSERVATION

A SERVICE-LEARNING
RESOURCE PACKAGE

PRODUCED BY
THE NATIONAL CENTER FOR
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806 Connecticut Avenue, N.W., Room 1106, Washington, D.C. 20525
The Center is a part of ACTION.

Introduction

The National Center for Service Learning urges you to take a good hard look at the energy crisis. How does it affect you, your students, your school, your community?

Despite the seemingly insurmountable complexities of this national issue -- from oil cartels to the practicality of solar energy -- students can be instrumental in championing a grassroots effort to ease the crisis and raise the consciousness of Americans. Long the vanguard of change, young people can provide the impetus for a new perspective on American lifestyles.

NCSL encourages you to use this resource package as a tool, an idea generator, a "jumping off" point for integrating energy conservation into your school curriculum or your student volunteer activities.

As a resource tool, this package is designed to offer guidelines suggestions, and advice on how to utilize students in energy conservation projects. It grapples with many of the concerns of the energy crisis -- community involvement, alternative energy, grassroots conservation efforts -- and illustrates, by example, the impact students are making in these areas.

We suggest you begin by reading the examples highlighted in Secion I, "Successful Projects: What Student Volunteers Can Do." These projects combine ingenuity, enthusiasm, and education in an effort to provide communities with alternatives to over consumption and waste.

The following sections build on the examples -- strategies for community organizing; energy and education; funding sources. The "Selected How-tos" in Section V demonstrate that a solar greenhouse is a feasible project for a high school science class. It's also a feasible project for a college student volunteer program serving the elderly.

Lastly, the package includes an extensive organization bibliography and a resource bibliography. We have included those organizations and resources which can answer your questions, enrich your program, and embellish your activities.

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I. Successful Projects: What Student Volunteers Can Do

Young people have long been associated with projects which directly affect social and economic problems. Recycling, transportation alternatives, and environmental advocacy have been an integral part of student volunteer efforts for more than a decade. The energy crisis is no exception. Many students of high school and college age are committed to altering American energy habits, and they are particularly concerned with the impact the energy crisis has on the poor, the elderly, and the disadvantaged.

The following list illustrates some of the ways in which young people are involved in energy conservation. The variety of projects demonstrates a variety of approaches. It also demonstrates that whether on campus or in the community, students are making an impact. They are altering American lifestyles, alleviating the crisis on a grassroots level, and paving the way for change.

WHAT STUDENT VOLUNTEERS CAN DO

ENERGY AUDITS:

-- High school students across the country are conducting school building energy audits. Often their findings result in a savings of thousands of dollars which can then be rechannelled into the school's purchasing budget. For example, in one midwestern high school, the money saved on wasted energy alone was enough to purchase sorely needed gymnastic equipment.

-- Recruited by a midwestern Community Action Agency, college students conducted energy audits in over 200 rural homes of the elderly and disadvantaged. Their findings were incorporated in an emergency weatherization proposal which was later funded by the Department of Energy.

-- Student-conducted home energy audits in one southwest community resulted in the formulation of a grassroots advocacy project for lower utility rates. Student findings so incensed parents and community residents that a coalition for energy conservation was formed and utility rate reform legislation was drafted for submission to the city council.

-- In one southern community, student-conducted building audits have saved minority businessmen thousands of dollars. In an effort to reciprocate, the businessmen have sponsored a half-dozen, free-admission workshops on energy conservation for low-income residents.

WEATHERIZATION:

-- In conjunction with local Community Action Agencies, both high school and college students are acting as technicians in a variety of weatherization projects. Trained at school or by CAA personnel, students armed with caulking equipment, insulation, hammer and nails have successfully weatherized the homes of the poor and disadvantaged in rural and urban communities across the country.

-- In inner city Washington, D.C., high school students aided the residents of a low-income housing project weatherize their apartments. However, before they began their work, the students helped the tenants draft a landlord-tenant contract which stipulated that the money saved in energy costs would be used for building improvements. When the landlord agreed; the students went to work.

-- A local, non-profit group in The Bronx is reclaiming old buildings; weatherizing them, and maintaining them as affordable housing alternatives for low-income residents. In order to meet the unique challenges involved in renovating a severely disadvantaged neighborhood, the directors of the project have recruited Bronx high school students to serve as technicians, advocates and liaisons. The students -- many of whom have long-time records as underachievers -- have become so absorbed in the project that they use it, and the energy conservation methods it advocates, as the basis for in-school projects in science, consumer affairs, and law.

ENERGY EDUCATION:

-- High school students in a midwestern city are reaching energy wasters with skits and plays which poke fun at America's overconsumptive habits. The traveling troupe gives "impromptu" performances on street corners, in shopping centers, and in parks. At the end of each performance, players distribute checklists and booklets on how to conserve energy.

-- In inner city Washington, D.C., high school ecology teachers and the staff of a local energy alliance organization are combining their expertise to develop an energy conservation curriculum. They plan to pilot test the curriculum for 11th graders in the fall of 1980.

-- On one commuter campus, college volunteers sponsored a "One Day a Week, Take to Your Feet" campaign which succeeded in reducing commuter traffic by a third over a two-week period. A key to the success of the campaign included the distribution of literature on how to find a carpool, what kind of shoes to wear for the long haul, and the joys of walking.

-- Whether held on campus or at the local community center, a well-planned workshop on energy conservation can attract a large number of participants. In the Pacific northwest, a college-sponsored workshop on weatherization techniques, where faculty and students served as instructors, was so enthusiastically received the participants requested a follow-up workshop on solar energy and volunteered to donate the money to help the college defray the costs.

-- In the northeast and mid-Atlantic states, students are staffing energy hotlines. Specially trained for their consultantcy roles by faculty or staff of the state energy office, students can, on a particularly busy day, answer as many as 200 calls from anxious, energy-conscious community residents.

ALTERNATIVE ENERGY:

-- In the midwest engineering students at a technical college are conducting a feasibility study on windmill power as an alternative for rural homes. They are particularly interested in the impact of windmill power on the poorer farmer who is often unable to pay the high cost of electricity.

-- In New York City a non-profit group has recruited students from local high schools to participate in a pilot project on wind energy and composting. Their two-year plan included the installation of a windmill as an alternative source of electricity for a local high school.

-- In the southwest, the Indian Health Service (cosponsored by the Departments of Interior and Health, Education and Welfare), has sought the advice of design students and faculty at the state university in order to examine the feasibility of installing passive solar collectors at several of their health care facilities.

-- In the west, a community college student volunteer program and the staff of a community action agency pooled their resources and installed a solar greenhouse in an inner city community center. Besides serving as a focal point for a variety of community gardening activities, the greenhouse yields enough vegetables to feed the 60 residents of a nearby nursing home year round.

OUTREACH & ADVOCACY:

-- In an effort to apprise the house-bound handicapped and the low-income elderly of their services, a neighborhood energy alliance in the pacific northwest recruited young people to serve as outreach staff. Working in pairs, the high school aged youth canvassed the inner city, distributing literature, answering questions, and collecting survey information. Their efforts were instrumental in bringing the alliance's energy conservation services to this too often neglected group.

-- Long-time champions of citizen action and advocacy, Public Interest Research Groups (PIRGS) across the country are utilizing student volunteer manpower in energy-related activities. From gas bill boycotts to research studies on state utility laws -- students majoring in political science, law, and consumer affairs are leading the way in raising the consciousness of local citizenry.

-- College students in a large western city who enroll in a work study program are aiding the city council conduct its two-year study of energy supply and demand. Several of the students act as investigators and information gathers, reporting their findings directly to the city council. Others serve as liaisons between citizen action groups and the council, often providing citizens with the most accessible means to "cutting through bureaucratic red tape."

-- In rural West Virginia, students enrolled in a University Year for ACTION program serve as researchers and energy policy planners for a low-income legal services agency. Their contribution to the agency's policy study will help shape the future of utility rates in the Appalachian area.

II. Community Organizing Strategies

NCSL invites educators to explore their potential as energy conservation advocates through service-learning activities. By linking the classroom with the community -- by providing guidance for student volunteer energy projects -- educators can help foster a new energy conscious ethic. We encourage you to examine the energy needs of your community and utilize student volunteers to meet those needs.

It will take ingenuity to alleviate the energy crisis. It will take what a less sophisticated age once called, "good ol' fashioned American know-how." And, since so many successful energy conservation projects combine ingenuity and commitment on a grassroots level, we devote this section to community organizing strategies with service-learning activities in mind.

We begin with "Preliminary Planning," concrete suggestions for tapping into existing state and local resources. Included in this sub-section are two questionnaires designed to simplify data gathering.

"Getting Your Message Across," addresses the issue of motivating low-income people to alter their energy habits, while "Community Project Examples" highlights a spectrum of successful grassroots conservation efforts, several of which involve student volunteers.

All materials in this section are included because they are easily adaptable and replicable. Of course what works for some, won't necessarily work for others, but grassroots efforts across the country are making an impact, and time and again, students are a part of them.

A. Preliminary Planning: Some Ways To Get Started

Contact Your Governor's Office.

* Find out what planning is now going on at the State level for this winter.

* Offer to assist in any way you can with the planning and preparations now going on.

* Try to make sure that all Community Action Agencies (CAAs) in the state are part of this process, so that your activities during the winter will be coordinated with State efforts, and so that state efforts will be as responsive as possible to the needs of the poor.

* Touch base with the SEOO, the State Energy Office, and the State Civil Defense Agency. Find out just what state resources will be available and how to reach them in time of need. Find out what information about local needs you can provide that will help make state programs more effective.

Identify Households Most Likely to Need Assistance.

* Where are those most susceptible to threat to health or life: the elderly, the handicapped, the chronically ill?

  Many CAAs, through other program activities, will know where such persons are located. Other sources of information which you should consult include: Fire Departments, who frequently keep such information in record in case of fires; Area Agencies on Aging, and other aging organizations; Visiting Nurses Associations.

* Which are the households dependent on fuels that may be in short supply?

  Close and continuous consultation with dealers and distributors of fuel oil, kerosene, propane, butane, coal, and wood will be most important both to identify households in need and to make possible an accurate assessment of supplies and prices.

* Which households are presently without utility service because of disconnect? Which households have no heating fuel supplies on hand at this time?

  Again, fuel dealers and community service agencies should be able to help identify these households; and, of course, utility companies will be able to identify shut-off cases. However, this is something you should speak to the utility companies about right away, as there may be Privacy Act implications that will require study by their attorneys in order to define the conditions under which such information can be made available.

Excerpted from: Still Coping with the Energy Crisis, Community Services Administration, 1979.

This information is important for three reasons. First, it will make it much easier to get help quickly to those who need it when the time comes, second; it will enable you to start working with these households now, to take preventive measures that will help to lessen the impact of winter and avoid serious crises; third, it will help to define the nature and extent of the problem which your community faces, and will make it easier to build community support for the mobilization of the resources necessary to meet the need.

Identify the Problems That Will Cause the Need for Assistance.

* Lack of Money

In many areas, available federal assistance may not be enough for those who have the lowest incomes and are dependent on the most expensive fuels. You should try to assess the extent of this problem and work on mobilizing other available resources to help.

Moreover, many households may be without fuel now, and not have the money to purchase it before cold weather comes. Federal funds may well not get to local level in time to purchase fuel when they need it. Some arrangements will have to be made to get needed fuel to these households.

* Bad Housing Conditions

Families with particularly poor housing should be identified and steps taken to direct weatherization and home repair programs to them before winter comes.

* Lack of Transportation

It is possible that federal government mandating of home heating oil production could cause at least spot gasoline shortages, or further increases in gasoline prices that could severely threaten the ability of some poor persons to get to jobs, further compounding their problems. Standby carpooling or other arrangements may have to be made in such cases.

* Lack of Supply -- Shortages of Fuel Oil, Kerosene, Propane or Other Fuels.

You should contact all local fuel dealers and distributors right away. Find out:

-- Do they have contracts with their sources of fuel?
-- Do they have the normal quantity of fuel supplies on hand for this time of year?
-- Have they made the normal deliveries of fuel during the summer? (i.e., do their customers have the normal quantities of fuel on hand for this time of year?)

If the answer to any of these questions is "no", then this should be a matter of priority discussion by your local Energy Coordinating Council and with the State Energy Office. The State Energy Office should be told to report this information immediately to the Energy Regulatory Administration, Department of Energy, in Washington, D.C.; and should be asked if the State Set-Aside can be helpful in correcting the problem.

Above all, it is important that you and other resources in the community stay on top of the situation of energy supply, need, and price in your state and your community throughout the winter. Meet often with energy suppliers, public officials, and community resource agencies, and share information. Use the media -- radio, television, the newspapers -- to inform the public about these matters, so that they can take steps to prepare themselves to be ready for expected emergencies.

State Set-Aside Program

You should find out whether your state is participating in the State Set-Aside Program, and if so how large the set-aside is in your state, and what priority needs it is designed to meet. This program is a voluntary program that provides that the governor may establish a monthly set-aside of up to four per cent of distillate fuels (heating oil, diesel fuel, and kerosene) entering the State to be used to serve priority needs as determined by the State.

It must be understood that the state set-aside exists on paper only. It is an allocation tool, not actual fuel in state owned tanks. It also does not carry over from month to month ---- if the set-aside for November is not used, it does not accumulate so as to make a larger set-aside available in December. Also, once allocated the fuel must still be paid for.

All but five states are now participating, but many have established lower set-asides than four percent. Also, many may have priority uses for the set-aside that are not as responsive to the needs of the poor as now seems necessary. It is therefore important that you:

* Find out if your state is participating in the Set-Aside Program.

* If so, find out at what per cent, and make sure it is the maximum 4%.

* Find out what priority uses have been established for the set-aside in your state, and make sure that during cold weather, the home heating needs of the poor are high on the list.

An Ounce Of Prevention

Once you have identified people with potential problems, and the problems they are likely to have, you should work to help those households take preventive measures that will lessen the impact of cold weather, and that will make available fuel supplies last as long as possible; and CAAs should try to establish emergency stockpiles of fuels and supplies.

* Conservation/Emergency Weatherization

  Houses in the worst condition should be given quick repairs, such as repairing broken windows and patching holes in doors and walls. Local weatherization programs should give highest priority to those identified as most in need and with the worst housing, so as to at least stop the worst infiltration problems.

  Local fuel dealers should be asked to give highest priority in the servicing and tune-up of furnaces for those households with the least income, with elderly, and with the oldest furnaces that could benefit most.

  "Save Energy . . . Save Money", and similar guidebooks for energy conservation should be widely distributed, if possible with do-it-yourself kits for simple conservation measures like insulated window shutters which can save substantial amounts of energy and increase comfort.

  Where possible, unneeded rooms should be shut-off to conserve fuel.

* Warm Clothing and Blankets

  CAAs should try to make sure that priority households have adequate warm clothing and blankets.

* Safety Instructions

  Try to make sure that everyone understands the precautions that must be taken to avoid accidents with space heaters, and the real danger of fire from overloading electrical circuits. You should work closely with your local Fire Department to explain to everyone that they must not "over-fuse" -- that is, replace fuses with higher-rated fuses to prevent them from burning out when an electric space heater is turned on, for example. Fuses are there to prevent overloading of the wires, and the combination of over-fusing and an electric heater will melt the wires and start a fire, particularly if the wires are covered with insulation. Space heaters that use oil, kerosene, or coal must be properly vented or they may kill the people in the house, especially if steps have been taken to stop air infiltration.

- * Stockpiling

CAAs should try to stockpile emergency supplies of fuel now. This can also include making chain saws available in rural areas to cut firewood. Some CAAs have contracted with suppliers for future supplies, paying a premium of ten per cent of the current price in advance to assure the laying in of adequate supplies, with agreement to pay the full going price for purchases during the winter. Many dealers are being required to pay C.O.D. for their supplies, and this could help them with their cash flow.

- * Planning for Relocation

Plans should be discussed now for possible relocation of those households that will be unable to pay for heat or that use fuels that are likely to be in short supply. Relocation should be considered a last resort, and then, if at all possible, to friends or relatives rather than to mass shelters such as churches or schools. But such relocation may become necessary, and planning should start now. CSA will have more detailed guidance on this kind of disaster planning within the next few weeks; but in the meantime you should find out what disaster planning has already taken place in your community, and what kind of plans may exist for dealing with disasters such as floods, earthquakes, or air-raids. Check with local public officials, the Red Cross, or the Civil Defense Preparedness Agency.

The following two surveys are examples of data gathering instruments volunteers might use to elicit information from the target population to be served before an energy audit, weatherization, or conservation project gets under way.

FIGURE 1: SUGGESTED TELEPHONED OR MAILED QUESTIONNAIRE

NAME ______________ ADDRESS ______________ PHONE ________

NUMBER OF PEOPLE IN HOUSEHOLD? ______ NUMBER OVER 60? ______
NUMBER UNDER 12? ______ NUMBER UNDER 18 MONTHS? ______
NUMBER OF HANDICAPPED? ______ TYPE OF DISABILITY? ______
NUMBER CHRONICALLY ILL? ______ TYPE OF ILLNESS? ______

ARE YOU OUT OF FUEL RIGHT NOW? ______________
DO YOU OWE MONEY TO A FUEL DEALER OR UTILITY RIGHT NOW? ______________
WILL YOU BE OUT OF FUEL SOON (AND CANNOT PAY FOR IT)? ______________

DO YOU RENT OR OWN YOUR HOME? ______ LANDLORD OR AGENT'S NAME, ADDRESS, AND PHONE NUMBER ______________
WHAT TYPE OF HEAT DO YOU USE (fuel oil, gas, kerosene, etc.)? ______________
DO YOU HAVE ANY OTHER SOURCE OF HEAT AS A BACK-UP (wood, electricity, etc.) ? ______

WHAT KIND OF BUILDING DO YOU LIVE IN (trailer, apartment, single-family, etc.)? ______

IS YOUR FURNACE IN GOOD REPAIR? ______ IS YOUR HOUSE "WEATHERIZED"? ______
DO YOU NEED INFORMATION ON INSULATION, STORM WINDOWS, ETC.? ______________

DOES YOUR DEALER CHARGE CASH ON DELIVERY? ______ CASH BEFORE DELIVERY? ______
WHEN DID THIS BEGIN? ______________
DOES YOUR DEALER DEMAND THAT YOU BUY IN BULK? ______ IF SO, HOW MUCH? ______
WHEN DID THIS BEGIN? ______________
HAS YOUR DEALER TOLD YOU THAT YOU MAY BE DROPPED FROM THE DELIVERY ROUTE? ______
IF SO, WHEN? ______________

DO YOU HAVE ANY SPECIAL PROBLEMS? ______________

IF YOUR HOME RAN OUT OF HEAT, DO YOU HAVE A PLACE TO GO? ______ PHONE NO. ______
ADDRESS ______________

CAN YOU OFFER HELP TO OTHERS IN A HOME HEATING EMERGENCY? ______________
WHAT KINDS? ______________

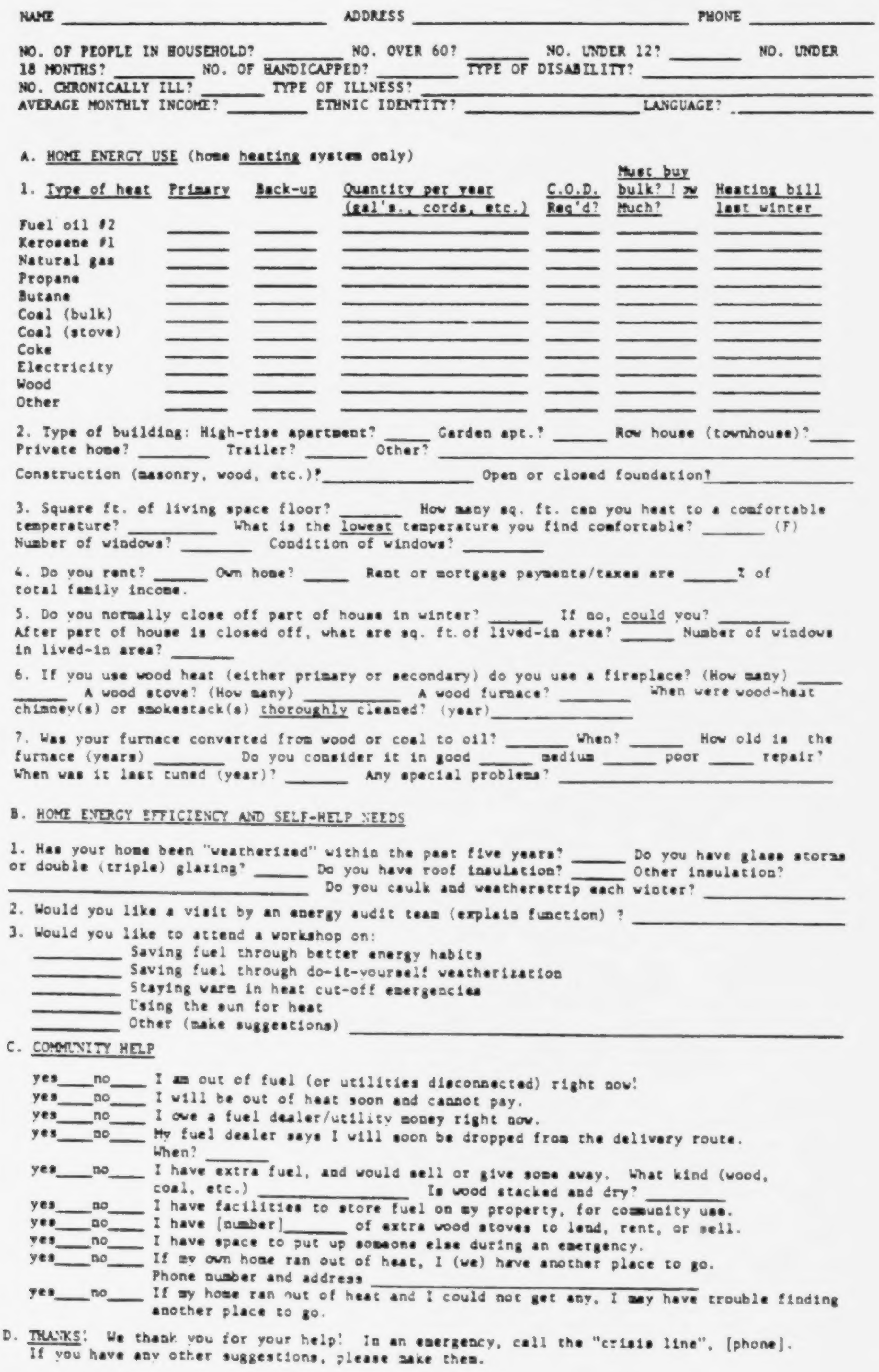
THE LOCAL "CRISIS LINE" PHONE NUMBER IS [phone]. IF YOU NEED TO GET IN TOUCH WITH ANYONE FOR HELP, CALL THIS NUMBER!

If this survey is telephoned, be sure they know the office you are calling from (CAA, Emergency Management, Energy Co-ordinating Committee, etc.).

If the survey is mailed, send a covering letter. It would be useful to include a postpaid addressed envelope to facilitate return, and a copy of No More Heat? A Self-Help Booklet for self-help purposes.

From: Community Planning for Home Heating Emergencies. CSA, 1979

FIGURE 2: SUGGESTED QUESTIONNAIRE TO BE USED BY OUTREACH WORKERS



NAME ____________ ADDRESS ____________ PHONE ____________

NO. OF PEOPLE IN HOUSEHOLD? ______ NO. OVER 60? ______ NO. UNDER 12? ______ NO. UNDER 18 MONTHS? ______ NO. OF HANDICAPPED? ______ TYPE OF DISABILITY? ______________
NO. CHRONICALLY ILL? ______ TYPE OF ILLNESS? ______________
AVERAGE MONTHLY INCOME? ______ ETHNIC IDENTITY? ______________ LANGUAGE? ______________

A. HOME ENERGY USE (home heating system only)

1. Type of heat	Primary	Back-up	Quantity per year (gal's., cords, etc.)	C.O.D. Req'd?	Must buy bulk? How Much?	Heating bill last winter
Fuel oil #2						
Kerosene #1						
Natural gas						
Propane						
Butane						
Coal (bulk)						
Coal (stove)						
Coke						
Electricity						
Wood						
Other						

2. Type of building: High-rise apartment? ____ Garden apt.? ____ Row house (townhouse)? ____ Private home? ____ Trailer? ____ Other? ______________
Construction (masonry, wood, etc.)? ______________ Open or closed foundation? ______________

3. Square ft. of living space floor? ______ How many sq. ft. can you heat to a comfortable temperature? ______ What is the lowest temperature you find comfortable? ______ (F)
Number of windows? ______ Condition of windows? ______

4. Do you rent? ______ Own home? ______ Rent or mortgage payments/taxes are ______% of total family income.

5. Do you normally close off part of house in winter? ______ If no, could you? ______
After part of house is closed off, what are sq. ft. of lived-in area? ______ Number of windows in lived-in area? ______

6. If you use wood heat (either primary or secondary) do you use a fireplace? (How many) ______ A wood stove? (How many) ______ A wood furnace? ______ When were wood-heat chimney(s) or smokestack(s) thoroughly cleaned? (year) ______

7. Was your furnace converted from wood or coal to oil? ______ When? ______ How old is the furnace (years) ______ Do you consider it in good ______ medium ______ poor ______ repair?
When was it last tuned (year)? ______ Any special problems? ______________

B. HOME ENERGY EFFICIENCY AND SELF-HELP NEEDS

1. Has your home been "weatherized" within the past five years? ______ Do you have glass storms or double (triple) glazing? ______ Do you have roof insulation? ______ Other insulation? ______________ Do you caulk and weatherstrip each winter? ______

2. Would you like a visit by an energy audit team (explain function) ? ______________

3. Would you like to attend a workshop on:
______ Saving fuel through better energy habits
______ Saving fuel through do-it-yourself weatherization
______ Staying warm in heat cut-off emergencies
______ Using the sun for heat
______ Other (make suggestions) ______________

C. COMMUNITY HELP

yes____no____ I am out of fuel (or utilities disconnected) right now!
yes____no____ I will be out of heat soon and cannot pay.
yes____no____ I owe a fuel dealer/utility money right now.
yes____no____ My fuel dealer says I will soon be dropped from the delivery route. When? ______
yes____no____ I have extra fuel, and would sell or give some away. What kind (wood, coal, etc.) ______________ Is wood stacked and dry? ______
yes____no____ I have facilities to store fuel on my property, for community use.
yes____no____ I have [number]______ of extra wood stoves to lend, rent, or sell.
yes____no____ I have space to put up someone else during an emergency.
yes____no____ If my own home ran out of heat, I (we) have another place to go. Phone number and address ______________
yes____no____ If my home ran out of heat and I could not get any, I may have trouble finding another place to go.

D. THANKS: We thank you for your help! In an emergency, call the "crisis line", [phone]. If you have any other suggestions, please make them.

From: Community Planning for Home Heating Emergencies. CSA, 1977.

B. Getting Your Message Across: Some Tips On Trying To Persuade People To Change Their Energy Habits

MOTIVATION FOR ENERGY CONSERVATION

The most severe impact of the constant and rapid rise in the cost of energy has been felt by poor people. In 1979, the cost of energy represented approximately 21% of a poor family's annual budget, as compared with 5% of a middle-income family's budget. The cost of energy for the poor has risen at a rate two times faster than the overall Consumer Price Index.

Poor people are thus forced to conserve, but conserve under circumstances that maximize the discomfort they must face. Lowered temperatures and less light in housing that is drafty, poorly insulated, and inefficiently heated, can only worsen the health problems they already face. Aside from the difficulties that may arise from cold and drafty environments (which may be as extreme as death from hypothermia), the related physical problems caused by less food and cheaper clothing also weaken resistance to illness.

The energy crisis, then, and the economic and health problems it has caused, force poor people to reallocate meager resources and conserve energy. Information cited by most people interviewed through this project states emphatically that low-income people have no choice but to conserve. Personal conservation efforts, however, have been haphazard, not well informed, and thus not fully effective.

CSA examines two approaches to motivating this target group: media-based and personal contact.

Media Based Efforts

Media-based efforts are those which try to persuade people to change their energy use habits through information relayed through printed material (handouts, booklets, newspapers, etc.), radio, TV, and so forth. Personal contact efforts are those in which people, acting as canvassers or as workshop coordinators try at first to convince other people to change their energy use habits by word-of-mouth. Once a decision has been made to change energy use habits, they follow-up by trying to reinforce the efforts and actions through further personal contact (e.g., repeated visits or peer group pressure) and/or technical reinforcement devices reinforcing energy use habits through the use of machines or gadgets. (For example, technical reinforcement would be when people learn how to read their electric or gas meters, use infra-red cameras or photos to see how infiltration has stopped, use simple techniques

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Excerpted from: Motivation for Energy Conservation, Community Services Administration, 1980.

for identifying drafts around windows, and so forth.) Most CAAs have had a fair amount of experience with person-to-person contact but usually less experience with media efforts and behavioral science.

To what degree should a motivation campaign focus on one of these types of efforts while excluding the others? A consensus of interviews and literature suggests that media-based efforts by themselves provide information but that information by itself does not provide action. Interpersonal efforts, on the other hand, are useful in provoking action, especially in dealing with low-income people, who are less open to a broad range of media influences. Interpersonal efforts should constitute the core of such a project.

Could media-based programs, which reach considerably more people at comparatively less cost, be developed that would motivate action? Possibly. The Stanford Heart Disease Prevention Program, which conducted a pilot heart disease action program in two California communities, found that media efforts that teach specific useful actions or skills were more effective in motivating action than other kinds of media efforts. But even in the communities where they were tested, it was found that media alone in one year or less was not as effective as a combination of media and interpersonal efforts. Although over a two-year period the effects of media and interpersonal contact efforts were equal, when the campaign was over those influenced by media alone lost their new habits faster. And although from a cost-effectiveness point of view media reaches more people per dollar spent, its exclusive use is too costly for CAAs to afford. A combination of interpersonal efforts and media which teach specifically useful habits seems effective.

An ideal motivation program, then, would involve some mix of media, interpersonal contact, and personal and/or behavioral reinforcement efforts.

Interpersonal Contact: Who Does It, How Is It Done, What Is the Backup, and Who Should Be Contacted?

If the core of a motivational program is interpersonal contact, who is to be recruited to do this? Ideally, the contact person should be someone who has helped the client in the past and has provided consistent, valuable service.

Whether the person introducing this information is known or new, trust around the specific issue must be developed before any consistent behavioral change can take place. That trust is developed as a result of reliable information relayed (several projects interviewed have stressed the disastrous effects of relaying inaccurate information about what savings will occur), convincing the "clients" that the contact person cares about them and is emotionally involved in their needs. Other needed factors are consistency in contact and patience.

Overall, the contact person can be seen to go through five distinct steps while motivating change:

1. Diagnoses the problem and solution: for individuals and groups, identifies the problem, what behavior has to be changed, how to change it, who needs to be contacted in order to change it, what potential effects the change will have (both desirable and undesirable), and how to maintain the behavior.

2. Motivates intent to change in client: talks to client about the problem, talks about what could happen if the problem were resolved, shows how behavioral change can solve part of the problem, encourages the client to think about the problem and take action to adopt new behavior, and gets a commitment to do so if possible.

3. Provides action: when the client decides that a situation must be changed (around energy issues, many have already made this decision) but does not know how to do so, the contact person provides action information and works with the client to develop more where necessary.

4. Reinforces action: stabilizes change, maintains new behavior, and prevents fallback through constant reinforcement, personal and otherwise.

5. Creates self-reliance through continued action and awareness: phases out dependency of client on contact person, while maintaining new behavior.

What Characterizes the Decision to Change Behavior by Individuals? What Mechanisms Are Used?

Overall, the person who has decided to change his behavior has been approached with specific information, relayed in a way that is both immediately personal and practical. Do not generalize. As a rule, the more immediately personal the approach, the better. Information must be individualized as much as possible. It is not enough to talk about "houses"; you must talk about "the house" of the persons you are talking to; their specific children; how their own health could improve, and so forth.

Once approached, the individual typically goes through five stages to adopt an innovation:

1. awareness
2. interest
3. evaluation
4. trial
5. adoption

Between the stages of interest and evaluation, the individual supplants "awareness" knowledge (information) with "how-to" knowledge. After this, maintaining the new behavior comes about through proof of its value (it is better than current practice); its compatibility with existing values, past experience, and needs; its simplicity; and the ease with which its effects can be observed and experimented with. If it passes these tests, it should also be reinforced with the knowledge of basic principles, i.e., "why it works."

Getting people to try an innovation is really the key. Rogers and Shoemaker say that most people who try something new will move to adopt it, if there is a distinct advantage.

How might this personalized information be introduced in a target area? Two approaches have been suggested and are frequently used: group workshops and home visits.

1. Group Workshops

Group workshops are effective and within the limits of the definition of "personal." They gather people centrally to learn things which may be more difficult to teach in a dispersed manner, as well as providing group reinforcement for change. Since learning in a group does not permit extensive individualized attention, however, a program based on workshops alone may present problems with low-income people. The time it may take to explain something to the slower learners within a group and the receipt of feedback about what is being learned may not be best served by a workshop format. Operationally, workshop/group meetings may be difficult for inexperienced low-income groups to set up effectively. Workshops may also be difficult to organize due to an area's geography. In a rural setting, for example, because of dispersed residences, workshops may fail to attract many of the poor. Nor do workshops always adequately estimate the individual needs of given homes. Nevertheless, the social reinforcement provided by them and the teaching convenience they provide make them useful when paralleled, if necessary, by individual home visits.

2. Home Visits

Home visits are a more individual, more direct way to instruct and motivate people in the conversation of energy. They permit the individualized attention and pace that workshops do not, the development of trust so important to the maintenance of changed behavior, and the participants' development of pride and interest that comes from working on one's own home. On the other hand, home visits are considerably more time-consuming, cannot cover the same numbers of people as workshops, and do not have the same social reinforcement effect.

Whichever approach seems the most practical (or a combination of both), the choice of vehicle ought to proceed from the character of the local target area. Puerto Rican urban communities, for example, in which extended families play an important role and which are heavily concentrated in city neighborhoods, might be more appropriately approached with a workshop format, perhaps held in the buildings in which they live. The rural aged, on the other hand, isolated in one or two person groups, living at great distances from community centers, lonely and no longer accustomed to social gatherings, might better be served with home visits. If workshops are necessary, traveling rural workshops might be developed which conduct sessions in a van. These would serve the needs of the rural poor to get out and be in a group, but not to travel too far from home.

To summarize, cultures that center around group or extended familial ties might be most effectively approached in an already existing group, while cultures that stress individual family visits or are geographically separated might prefer home visits. Optimal change occurs at the local social system level, whatever it is.

Broad Social Change and Low-Income People

Considered at the social system level, a broad degree of public awareness is necessary before an innovation can be adopted by even a minority in a community. It is estimated that 40% of a community must know enough about an innovation to be able to make decisions before a rate of adoption of even 10% can take place. After that, a change takes off.

C. Community Project Examples

FITCHBURG: Community Works Together to Conserve Energy

The Citizens of Fitchburg, Mass. had to FACE the facts: with winter coming to their northeastern industrial city of 40,000 and with heating oil costs nearing $1 per gallon, many residents would have to choose between food and fuel. Following a challenge by ACTION to become the first city in the U.S. to address the energy problem, the citizens of Fitchburg organized the Fitchburg Action to Conserve Energy (FACE).

"The premise of the program," said ACTION's Program Coordinator for the Fitchburg Project Francis Luzzatto, "is that communities either have the resources or have access to the resources to address the first 25% of their home energy consumption. All communities have to do is believe that they can do it and then plunge."

"The important thing is to create momentum," Luzzatto said: "what we found in Fitchburg is that the people were eager to get involved once they understood the impact the program would have on their community and on their own pocketbooks."

FACE Technical Director Brian Angus, a former VISTA volunteer who resides in Fitchburg, stressed that the FACE effort is rooted in the concept of local self-help. "Our goal," said Angus, "is to caulk, weatherstrip, and otherwise winterize as many of the homes as possible before the New England winter settles in." Angus reports great enthusiasm among area residents to learn no-cost and low-cost energy-saving techniques, which are taught by volunteers at eight FACE neighborhood centers. "When people learn that a $20 investment and a little effort can save $200 to $300 in energy bills," said Angus, "it doesn't take them long to get involved."

The FACE project was initiated by ACTION, though the direction of the project was assumed by the FACE Advisory Council from the beginning. ACTION's committment was to let the citizens of Fitchburg evolve the project design based on the community's needs and resources. "FACE," said ACTION Director Sam Brown on a visit to the project, "shows what happens when communities get tired of waiting for government to solve their problems and take leadership into their own hands." Brown said, "FACE is showing the rest of the U.S. what can be done when people organize themselves around the issue of energy." Following FACE's heavily publicized initial efforts, other communities around the country are inquiring how to start local energy programs. ACTION's role is to disseminate the lessons learned from the FACE effort and to support other communities who may want to initiate similar programs.

A FACE volunteer weatherstrips a home as part of Fitchburg, Mass. effort to cut energy bills. FACE is the nation's first community-wide volunteer program

The FACE project, which began October 24th, hopes to cut Fitchburg's annual home oil consumption by over 2½ million gallons, reducing fuel bills by $2 million. The U.S. Department of Energy had granted the Montachusetts Opportunity Council, $150,000 to totally weatherproof a limited number of low income homes: ACTION helped to convince DOE to allow those funds to be used by local volunteers to do partial weatherproofing in a much larger number of homes. ACTION also helped Fitchburg get the Department of Housing and Urban Development to grant the city $95,000 for weatherproofing materials for moderate-income families; well over half of Fitchburg's residents qualified for help under either the DOE funds or the HUD grant.

Next, over 300 local volunteers—Fitchburgh State College students, retired persons, RPCVs and ex-VVs—were organized to distribute informational leaflets, staff the neighborhood Centers, and help weatherproof the homes of citizens unable to do it themselves. Leaflets were also circulated by city school students, in newspapers and with utility company bills. FACE quickly won the cooperation and support of local leaders, the local media, churches and synagogues, civic organizations, local businesses, and schools . . . every sector of the community. The message spread rapidly—home heating bills could be cut by up to one third if a few simple, cost-free and inexpensive conservation measures were taken.

At the FACE centers, citizens are learning to caulk windows, weatherstrip doors, clean their refrigerators coils, lower the temperature setting on their hot water heaters, and reset their thermostats and take other low cost measures. They are also learning that a $300 annual bill for electrically heated water can be signficantly reduced simply by installing plastic flow-restrictors in showerheads.

FACE volunteers report that the project's goal is to reduce Fitchburg's yearly home fuel consumption by 25 to 30 percent. "All indications are that we're going to make it," said FACE Project Director Tom Cunningham. "Imagine," said Cunningham, "what it would mean if the FACE effort was duplicated around the nation." Commenting on the work being done by Fitchburg residents, Massachusetts Senator Paul Tsongas, an RPCV/Ethiopia, called FACE "a model of cooperation between the Federal, State, and local branches of the public sector."

In one month since the project's inception, "FACEing" one's house has become part of the local vocabulary in Fitchburg. It could happen as fast in every U.S. community, and as Brian Angus points out, "former Peace Corps and VISTA people are naturals for organizing and coordinating similar projects." Readers who would like more information about the FACE effort and how they might work towards similar goals in their own communities, should contact: Tamera Stanton, Office of Voluntary Citizen Participation, ACTION, Washington, D.C. 20525. Tel (800) 424-8580, Extension 77.

Reconnection, The Newsletter of former Vista & Peace Corps Volunteer, Dec. 1979.

Solar Pioneers

By Bill Hammond

Having designed a model low-cost solar building, gifted middle school students are turning to the community barn-raising concept to build it.

In Fort Myers, Florida, 98 gifted or academically talented seventh and eighth grade students from eight Lee County Schools have designed and—with some assistance—are building a solar classroom that will serve as a model for low-cost energy-efficient homes. They are showing that designing buildings to maximize the use of natural climate, the sun, and low-consumption technology has become an economical, practical solution rather than an exotic option.

The idea for the project grew from the group's urgent need for a classroom in which to meet for the Major Work Area program at the Environmental Education/Nature Center complex. Groups of 20 come to the Center for a full day of classes once every other week. With their teachers, Barbara Hamilton and Ruth Ann Hortman, the students decided that, like their pioneering great-grandparents, they must solve their classroom space problem themselves. At the same time, they would be presenting feasible alternatives to those most affected by the continuing rise in the cost of energy.

Since school budgets are very limited, the solution had to be a low-cost building that could demonstrate to the community energy- and money-saving building techniques and design while providing 1,200 square feet of usable space.

To complicate matters, the design had to take into consideration the fact that the building would be constructed by the students, their parents or other community volunteers, and—with their time and capabilities exhausted—possibly high school trade and environmental seminar classes. Funds being limited, construction (not completed at press time) has had to depend heavily on community donations (often in the form of materials, labor, and advice) and grants from private companies and governmental sources.

Turning the need for a low-energy design into a reality has been an exciting and productive educational experience for all involved.

First the students spent two months researching the problem in books and magazines and interviewing community resource people. Soon the students became involved in hands-on, do-it-yourself experimental projects, such as building and using solar cookers and distilling water with the sun. They studied the practical applications of wind power, composting toilets, water spray evaporative cooling systems, and wood-burning heat systems. They took field trips to a new solar-heated bank and to a home where the owner had developed his own solar furnace, home evaporative heating and irrigations systems, and many other practical inventions.

A More Modest Proposal: Solar Greenhouses

Numerous student groups across the country are designing and constructing—or helping others to construct—solar greenhouses.

Those wishing to initiate such a project may request building plans and a materials list for the construction of a low-cost model greenhouse from:

East Tennessee Community
Development Center
1522 Highland Avenue
Knoxville, Tennessee 37916.

A workshop packet also is available from:

New Mexico Solar Energy
Association
P.O. Box 2004
Santa Fe, New Mexico 07501.

Once the students became knowledgeable in the fundamentals of solar and low-energy design processes, they were ready to begin the actual design of their classroom building.

Local architects agreed to help. Each school day for one week an architect or team of architects from a different local firm presented, explained, and discussed with students alternative design concepts. Each day was different in terms of the architects' and students' approach to design and the interaction of the professionals and the amateurs. The sessions were a tremendous career education experience for the students—and for architects and teachers.

At the close of each day with the architects, the homework assignment for each of the five classes of Major Work Area students was "to build a working scale model of an energy conserving and self-sufficient building with approximately 1,200 square feet of working space in which you would like to go to school." Students received the option of working alone or in pairs on their models.

Two weeks later models of varying shapes, sizes, and design appeared. After individuals or teams presented and explained the functioning concept of their models, the classes began to list and compile the design ideas which they liked from the models shown. This compilation provided the basis for the design of a model which incorporates many of the most desirable of the characteristics of the first-phase scale models.

Passive energy systems utilizing the sun for heating are very practical in the south Florida area as temperatures rarely get below freezing. Cooling is the primary problem. Since the rainy season corresponds to the hottest months, an evaporative cooling system using recycled rainwater, wind-driven ventilators, carefully placed landscape plants (one large oak tree can pro-

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Bill Hammond is coordinator of Science and Environmental Education, Lee County Schools, Fort Myers, Florida.

vide the cooling of 10,000 BTU's) and good cross ventilation using prevailing breezes combine to provide a passive cooling system.

When the design was agreed upon, students, architects, parents and interested community members met all day one Saturday to determine the site and orientation of the building. Those attending formed four student-adult teams and searched the grounds of the 105-acre Environmental Education/Nature Center to find the best possible site. In choosing it they used aerial photographs showing the terrain and a list of criteria that included impact on vegetation, future expansion needs and plans, security, practicality of access and communication, openness for wind and solar energy sources, and available natural vegetation for cooling.

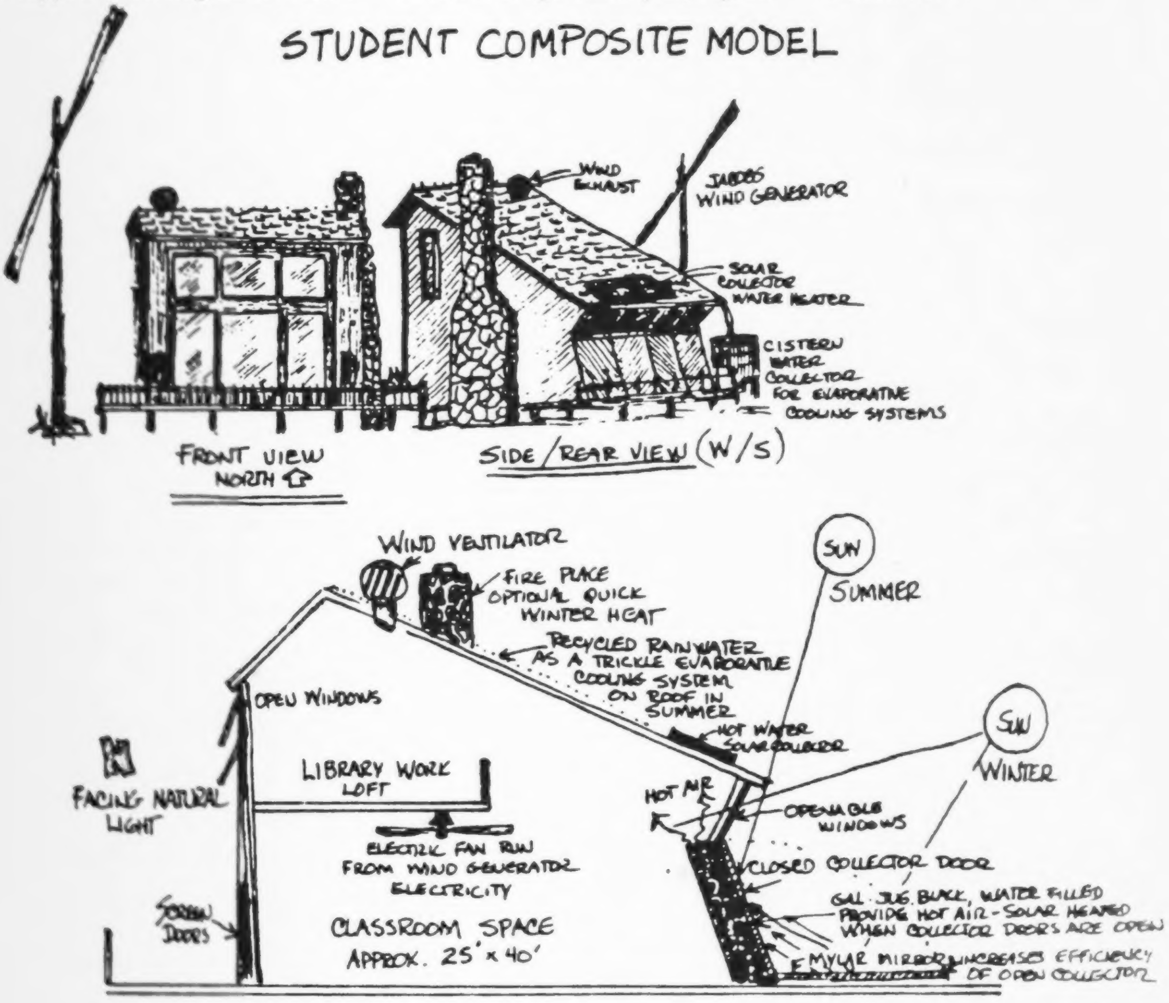
Students and staff then busied themselves seeking out funding. Major support is coming from Florida Power and Light Company, which will require students to carefully monitor such technical and financial results as exterior and interior temperatures and the operating and construction costs. Local businesses have been generous in donating needed supplies and materials.

The building of the facility now becomes much like an old-time barn-raising activity, with members of the community offering to pitch in and make the low-energy classroom building a reality before classes are under way this fall.

The project won't end there. If the application for a Florida Department of Education Environmental Education Mini-Grant for $5,000 is approved, students will develop a multi-media slide/tape show and a series of community how-to-do-it booklets based on their experiences with native plant landscaping for energy conservation, energy conservation design techniques, organic gardening, and waste collection systems. A student speaker's bureau on these topics is being established, and students are preparing to go out and speak to civic and community groups and organizations.

The former eighth grade participants will have moved on this year, but the former seventh graders will provide continuity as a new group twice the size of the pioneers enters the program.

These middle school students—potential leaders—are using mental and physical skills and a synergetic community approach to create a valuable, practical community model. Designing and building a solar classroom has been exciting for all—young and old, skilled and unskilled, community members and teachers. By sharing skills and labor, they have built a community model with a conservation ethic, have saved today to assure many tomorrows. ☐


STUDENT COMPOSITE MODEL
WIND EXHAUST
JACOBS WIND GENERATOR
SOLAR COLLECTOR WATER HEATER
CISTERN WATER COLLECTOR FOR EVAPORATIVE COOLING SYSTEMS
FRONT VIEW
NORTH ⇧
SIDE / REAR VIEW (W/S)
WIND VENTILATOR
FIRE PLACE OPTIONAL QUICK WINTER HEAT
RECYCLED RAINWATER AS A TRICKLE EVAPORATIVE COOLING SYSTEM ON ROOF IN SUMMER
SUN
SUMMER
OPEN WINDOWS
HOT WATER SOLAR COLLECTOR
SUN
WINTER
FACING NATURAL LIGHT
LIBRARY WORK LOFT
HOT AIR
OPENABLE WINDOWS
ELECTRIC FAN RUN FROM WIND GENERATOR ELECTRICITY
CLOSED COLLECTOR DOOR
GAL. JUG. BLACK, WATER FILLED PROVIDE HOT AIR - SOLAR HEATED WHEN COLLECTOR DOORS ARE OPEN
SCREEN DOORS
CLASSROOM SPACE APPROX. 25' x 40'
MYLAR MIRROR INCREASES EFFICIENCY OF OPEN COLLECTOR

Moving the Masses

Students for Mass Transit keep Jacksonville informed on the city's public transportation needs and what officials are doing to meet those needs.

"Time to begin," said a balding man to the half dozen officials talking quietly at the conference table. "We're all here."

A city councilman glanced at the dozen citizens who had come for the hearing on public transportation and said, "Let's wait a few minutes. The experts' bus is probably running late again. If we had that people mover——"

The chairman pounded his gavel and growled, "Meeting will come to order."

The councilman started to protest, but he relaxed as three teenagers—their arms full of books and papers—hurried into the room. He smiled at the chairman. "Fire when ready. The reinforcements have arrived."

This kind of scene is likely to take place when city officials meet to discuss any issue affecting mass transit in Jacksonville, Florida.

Since 1974 Students for Mass Transit (SMT), 40 volunteers from Jacksonville's high schools, have been waging a unique long-term campaign to educate their fellow students and the public on:

- The advantages (including energy conservation, reduced air pollution, reduced traffic congestion, and economy) of improved and expanded mass transit;
- Public officials' policies and actions regarding mass transit;
- Amounts and sources of funds for the city's transit system.

Among the weapons in the volunteers' arsenal are a quarterly newsletter, fact sheets, a slide show, and reports on what public officials have said and done. Wielding the weapons is a time-consuming after-school activity for which volunteers have not received academic credit (they may receive half a unit under science or social studies this year). Nevertheless, students from up to 15 Duval County (Jacksonville) high schools compete to enlist in SMT.

As school opens each year, science teachers distribute applications which ask students what courses they are taking and why they want to join SMT. The adviser, William R. Fryar, Supervisor of Science and Environmental Studies for the Duval County Schools, uses the applications to select 40 students (no more than five from a school). Because the volunteers spend the first half of the school year learning about mass transit in general and local mass transit in particular, almost all new volunteers are juniors who will provide continuity and leadership in their senior year.

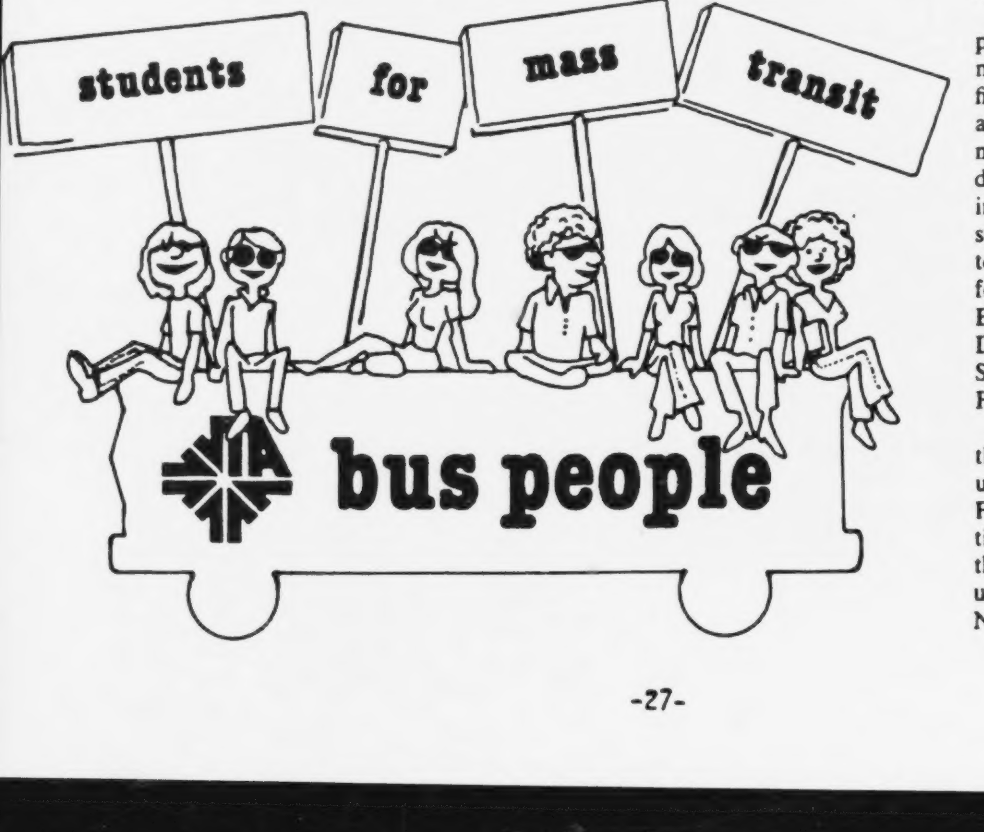
Approximately 15 to 20 usually fail to complete a full year, for the program is a demanding one. The students want it that way. Volunteers can continue to participate only if they meet the following requirements:

- Attendance at biweekly seminars (no consecutive absences permitted);
- Active participation as a task force member and in all special events;
- Minimum score of 90 percent (set by students) in the tests given on material covered in seminars;
- Using the mass transit system and maintaining a log on conditions (adherence to schedule, comfort, drivers' behavior) observed while doing so.

Students attend two-hour seminars every other Wednesday afternoon at the school board's administration building. Most get there, of course, by public bus, using special tickets purchased by SMT with funds from one of several grants.

The first five seminars feature presentations by local transit, planning, pollution control, energy office, and elected officials. Students also study the national picture, mostly through commercially produced audio-visual materials. (Those interested in receiving a list of instructional materials should write to Dr. William R. Fryar, Students for Mass Transit, c/o Science and Environmental Studies Department, Duval County School Board, 1325 San Marco Boulevard, Jacksonville, Florida 32207.)

With basic training completed, the volunteers join at least one and usually two or three task forces. From then on the seminars include time for planning and reporting on the progress of various activities undertaken by the task forces: the Newsletter, Councilmen Visit and



Letters to Congress, Public Information/Promotion, and Special Events.

The Newsletter task force produces the quarterly "Mass Transit-topics" for distribution to the community and all Duval County science and social studies teachers. Articles include interviews with city council members and other local policymakers, reports on progress toward the goal of Jacksonville obtaining a federal grant to install a downtown mass transit system called a people-mover, stories on local and federal legislation affecting mass transit. The interviews with local officials are being collected for publication in a booklet to be called "How They Stand."

The Councilmen Visit and Letters to Congress task force concentrates on meeting with selected council members and reporting on their opinions—and the actions they take. This group of volunteers also arranges for city officials to take part in SMT seminars and organizes letter-writing campaigns to influence legislators on mass transit issues.

Preparing and distributing special materials for the general public are the major responsibilities of the Public Information/Promotion task force. A major project has been issuing fact sheets with easily read data on such subjects as pollution, health problems, the cost of owning and maintaining an automobile, and the city's energy consumption.

Many of the materials are distributed to the public by the Special Events task force. At any large gathering this group sets up its portable booth, a wooden structure eight foot tall and brightly painted with scenes of mass transportation. Here the volunteers answer questions and pass out the fact sheets, newsletters, and such other items as SMT buttons saying "Mass transit moves me" or "I get around." Members of this task force also prepare exhibits for such occasions as National Transportation Week. SMT volunteers also give many classroom presentations.

All of these projects take money, and SMT's success is indicated by the relative ease with which it acquires funding. The first year the only sponsors were the Kiwanis Club and the Florida Lung Association, which still give SMT $350 and $250 respectively a year. Fryar recommends that those wishing to initiate mass transit projects approach similar local sources; lung associations throughout the country are concerned with improving air quality and may be receptive.

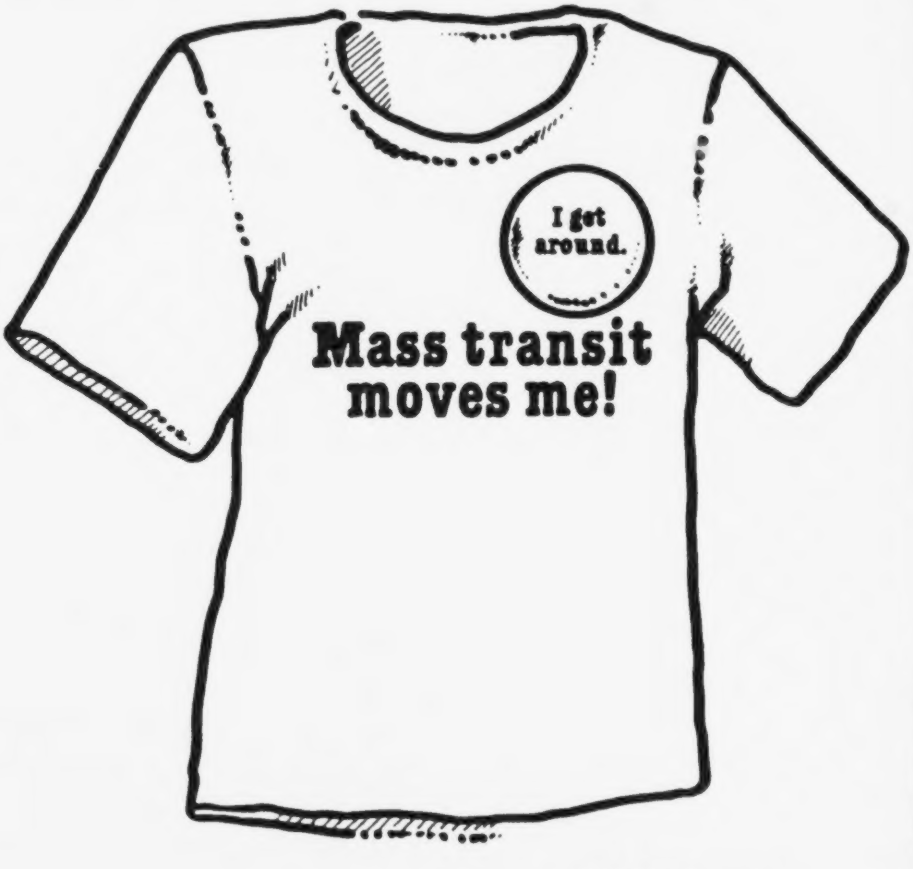
The Duval County Schools make some contributions, particularly in terms of space and equipment. The major funds (about $3,000) come from a Florida Department of Education's Office of Environmental Education mini-grant.

The single largest annual budget item (roughly $1,500) is printing and reproduction. Another major item has been instructional materials, with SMT having spent about $1,250, primarily on audio-visual presentations that may be used for several years. Other costs include fees for artists who designed publications, a telephone answering service with a recorded energy message, postage, SMT T-shirts and buttons, bus tickets, and partial payment for the adviser's after-hours work.

Fryar considers the funding generous and does not believe that others should hesitate to start similar programs because of limited resources.

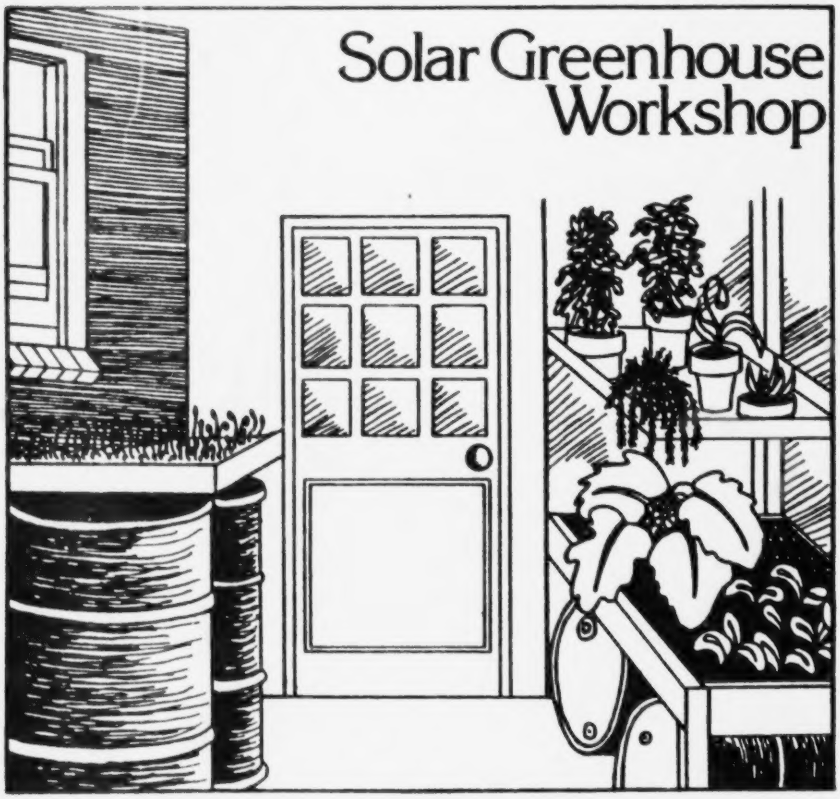
An impressive list of cooperating agencies is another indication of the progress SMT has made. SMT has consulted with and/or provided assistance to the Jacksonville Transportation Authority (whose work students monitor constantly), the Energy Office of the Jacksonville Electric Authority, the Florida Department of Transportation, the Urban Mass Transportation Administration, and the American Public Transit Association. Staff members of national as well as local groups have come to observe SMT and to advise on steps volunteers should take.

So far as Fryar knows, SMT is the only project of its type in the country. He and the SMT student volunteers look forward to losing this distinction soon, for they believe that others should carry on the campaign in communities throughout the United States. ☐


I get around.
Mass transit moves me!

Solar Greenhouse Workshop

Maine Organic Farmers and Gardeners Association
Northeast Carry
Hallowell, Maine
Since Spring 1978



Hammer-wielding neighbors raise an attached solar greenhouse in two days, and Mainers discover the joys of year-round growing.

what made it happen

Marriage of a long-time gardening group and a new appropriate technology organization
Experienced workshop leaders
One local coordinator, two resource people
Mixture of experienced/inexperienced folks
Two to three months of systematic planning
Charge of $15 per participant
Maximum 20 attendees
A $1500 state grant; a $2000 extension

what happened

Food-producing greenhouses appearing around the state provide a year-long growing season in a cold climate.

recommended for

Audience Type

**

Organization Type

From: Reaching Up, Reaching Out, SERI, 1979

** Symbols represent that this activity is suited for everyone, however, the organization which sponsors it, must have the expertise to carry it out.

Because of a lack of available information and a degree of cultural resistance, the use of greenhouses in Maine has been limited mainly to the seasonal growing of seedlings and holiday flowers. However, because much of the state's food is shipped in from beyond the New England region, the potential for food- and heat-producing greenhouses is extensive.

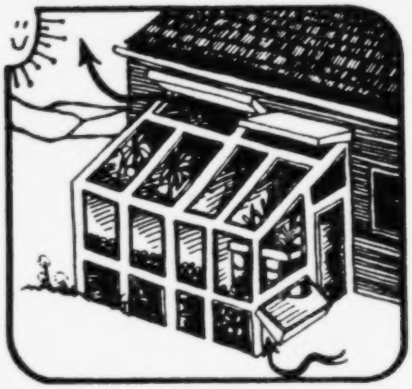
A new appropriate technology group, Northeast Carry, linked up with the Maine Organic Farmers and Gardeners Association (MOFGA) to hold solar greenhouse workshops throughout the state and demonstrate the adaptability of the attached, solar-assisted greenhouse in Maine. The project was funded with a small grant from the Maine Energy Office.

Originators of the program hoped to set into motion the multiplier effect that typifies hands-on workshops by training people who then pass their new-found skills on to others in their own communities. Using a small grant from the Maine Energy Office ($1500 for each of the first two years plus a $2000 extension), key organizers developed a plan which relied heavily on a network of existing groups and individuals.

Northeast Carry has the responsibility of general organizing through coordination with local MOFGA chapters, the University of Maine extension offices, and other in-place local rural groups.

A volunteer local coordinator in each community provides that important familiar face best suited to working closely with local press, businesses, and neighbors.

MOFGA, working with the Maine Energy Office, prepared articles for regional magazines and environmental publications and held a press conference to kick off the workshop program. Press releases sent to local media, flyers posted at key community gathering places, and less formal verbal networking spread the word for each upcoming greenhouse workshop.



Local coordinators help to identify possible sites for the workshop—a suitable home as well as an owner willing to provide materials and a concrete foundation in exchange for a weekend of free greenhouse labor are needed. A design package is forwarded to the homeowner well ahead of time and includes greenhouse plans, detailed site criteria, expected costs, and suggested materials. Followup visits by local technical resource people result in a site evaluation and final plans and materials list.

The workshop is designed for a maximum of 20 participants who each pay $15 to attend ($25 per couple). In order to use the limited workshop time most efficiently, each participant receives a preregistration packet with background information.

Agenda

Morning - First day of workshop

- —Introduction to solar energy: heat loss, solar gain, storage, insulation, reflectors, shutters
- —Environmental requirements for growing plants in a greenhouse: ventilation, air movement, carbon dioxide, growing mediums, alternatives
- —Construction sequence and plans: responsibilities of workshop participants and organizers

Afternoon - First day of workshop

Crew #1—Pre-cut and assemble south wall.
Crew #2—Fabricate door and vent panels, insulating and/or glazing as appropriate.
Crew #3—Pre-cut glazing for front and side walls; pre-cut wood lath for sealing glazing. Install flashing over styrofoam foundation insulation.
Entire Group— Raise greenhouse front wall, attach to house. Informal review of second day plans, question and answer period with resource people.

Morning - Second day of workshop

Crew #1—Pre-cut, assemble side walls; install vents, door, fitting, and weatherstripping.
Crew #2—Apply preservative to south wall framing. Cut and attach plywood to south wall framing for roof section; apply glazing to front wall.
Crew #3—Make alterations to existing house wall, i.e., door, vents, etc., or begin construction of planting beds or anything else forgotten or unique to the site and situation.

Afternoon-Second day of workshop

Crew #1—Install side glazing, exterior and interior paneling insulation.
Crew #2—Attach interior Monsanto 602 to front wall and install wood laths to cover staples. Install greenhouse roofing and attach flashing to house.
Crew #3—Make alterations to existing house wall, i.e., doors, vents, etc., or begin construction of planting beds or any last minute caulking of door, vent, and trim.
Entire Group— Celebrate completion of greenhouse and recap activities.

Northeast Carry is a non-profit organization set up to help revitalize the rural economy through the use of small-scale community industries and energy alternatives. MOFGA is the strongest organic gardening group in the country.

variations on the theme

- Build the greenhouse on a school or community building and use the experience as part of a school project.
- Hold a workshop in an existing greenhouse and focus on greenhouse gardening and maintenance.
- Develop a workshop on building and using cold frames.
- Organize a workshop to convert a south-facing brick wall to a passive solar Trombe wall.

for more information

The Complete Greenhouse Book: Building and Using Greenhouses From Cold Frames to Solar Structures p. 134
How to Give an Attached Solar Greenhouse Construction Workshop p. 151
A Solar Greenhouse Guide for the Northwest p. 135
Build Your Own Greenhouse Solar Style **(film)** p. 136

$aving Home Energy

Colorado Solar Energy Association
Denver, Colorado
Winter 1977

$aving home energy
a hands-on energy conservation and passive solar energy workshop

Courtesy of Heidi Hoffmann for the Colorado Solar Energy Association

Participants take caulk guns in hand to help low-income homeowners button up for winter in a weekend hands-on experience.

what made it happen

- Low-income homes identified by local winterization projects
- Donated tools, materials, and services from local businesses
- Six-member volunteer committee
- Five months of planning
- Budget of approximately $500
- One hundred and thirty-five attendees from the Denver metropolitan area
- Fee of $12; $10 for CSEA members

what happened

Nine low-income homeowners looked forward to a snug winter; a $1,700 profit was made, allowing publication of a workshop manual.

recommended for **

Audience Type

Organization Type

From: Reaching Up, Reaching Out: A Guide to Organizing Local Solar Events, SERI, 1979

** Symbols represent citizens who are interested in exploring alternative energy potentials and those organizations eager to institute change.

> "If all the individual homes of the world were conserving energy, we would see the true beginnings of a Spaceship Earth for which we're all equally responsible."

Six volunteers of the Colorado Solar Energy Association (CSEA) decided to dedicate hundreds of hours to putting on the $aving Home Energy Workshop as the first step to reaching this goal. They saw that conducting a hands-on workshop for their neighbors would help others see a clear place to start.

Although the committee would have preferred to focus the workshop on practical uses of solar energy, they knew the importance of "insulating before insolating." They chose to zero in on the reduction of home energy use, since installing solar would be a poor investment unless the building were first properly insulated, caulked, weatherstripped, and weatherproofed.

A workshop was designed to give people a comprehensive view of the subject. It included two weekday evening sessions, a Saturday hands-on weatherization session, and a Sunday lecture and tour of two well-designed passive solar buildings.

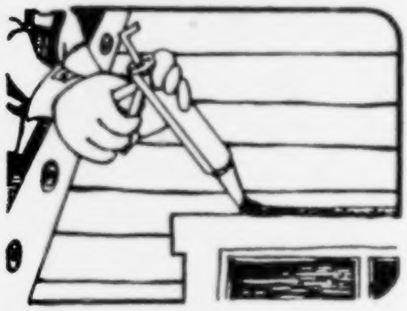
Bulk of the organizing work was carried out by a dedicated six-member core committee. Beginning with the birth of the idea in August 1976, the workshop took five months to plan. The committee met about every three weeks until December, and then once a week until the workshop in February 1977.

The committee pulled together a little over $500 to get the workshop off the ground; even so, some of the costs could have been reduced if more effort had been placed on obtaining donated services. As it was, 135 registrants actually showed up—50 were needed to break even.

Publicity activities included bulk mailing approximately 5,000 flyers to names culled from existing rosters and mailing lists of environmental organizations and solar energy groups. In addition, stacks of flyers were left at hardware, lumber, and grocery stores.

Press releases and Public Service Announcements were issued to local media, and posters were displayed on college campuses, community meeting centers, hardware stores, and other places of high visibility.

A great deal of preparatory time was spent securing donations of materials, tools, and funding from local businesses and organizations. Individual committee members took responsibility for contacting businesses, foundations, banks, utilities, and community groups. Key supporters were hardware stores, the local utility, the governor's energy office, and insulation companies.

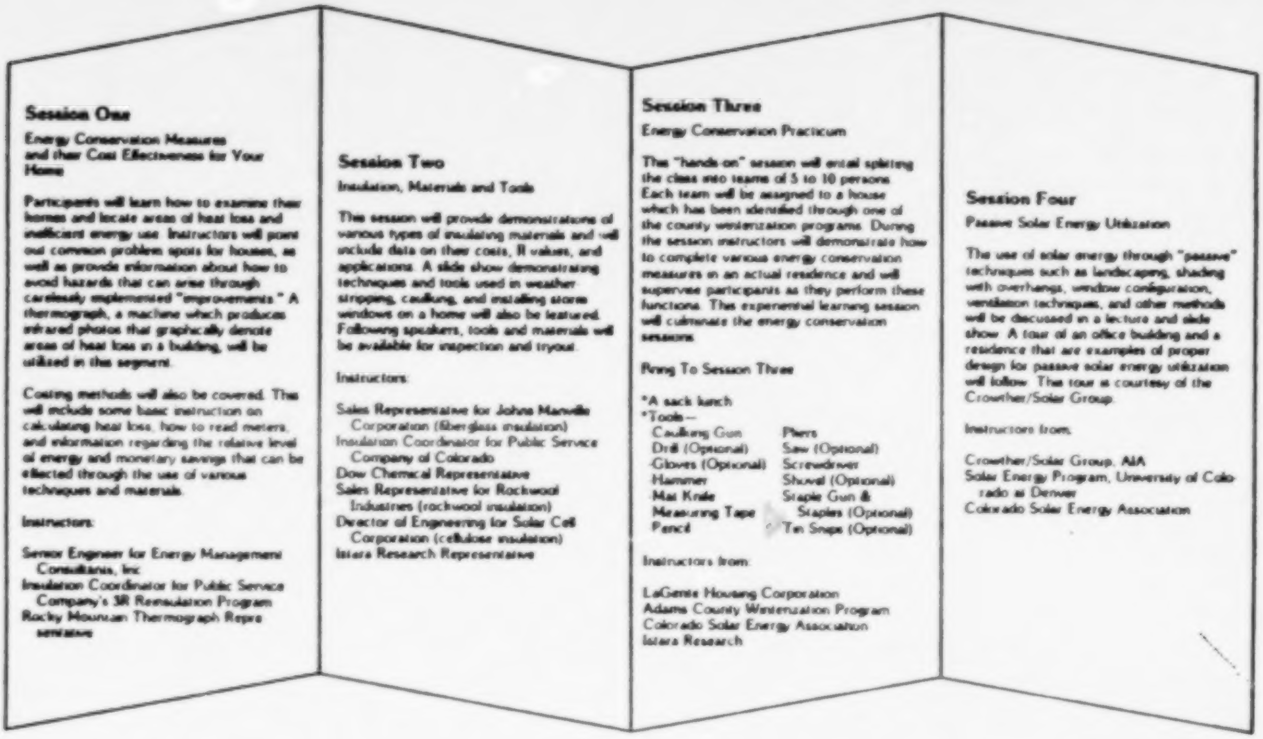


Break-Down of Workshop Expenses

(1976 Dollars)

General Expenses	
Printing/Typesetting 5,000 Brochures	$200.00
Postage	65.00
Facility Use Charge	30.00
Telephone Answering Service	32.00
Registration Materials	47.00
Xerox	25.00
Hands-On Session	
Tools, Ladder Rental	62.00
Instructor Reimbursements (CSEA memberships, travel expenses)	66.00
	$527.00

As most of the workshop participants had already adopted the conservation ethic to some degree, workshop leaders sought to provide them with the necessary information, skills, and confidence to undertake do it yourself energy conservation improvements on their own homes.



Session One

Energy Conservation Measures and their Cost Effectiveness for Your Home

Participants will learn how to examine their homes and locate areas of heat loss and inefficient energy use. Instructors will point out common problem spots for houses, as well as provide information about how to avoid hazards that can arise through carelessly implemented "improvements." A thermograph, a machine which produces infrared photos that graphically denote areas of heat loss in a building, will be utilized in this segment.

Costing methods will also be covered. This will include some basic instruction on calculating heat loss, how to read meters, and information regarding the relative level of energy and monetary savings that can be effected through the use of various techniques and materials.

Instructors:

Senior Engineer for Energy Management Consultants, Inc
Insulation Coordinator for Public Service Company's 3R Reinsulation Program
Rocky Mountain Thermograph Representative

Session Two

Insulation, Materials and Tools

This session will provide demonstrations of various types of insulating materials and will include data on their costs, R values, and applications. A slide show demonstrating techniques and tools used in weather stripping, caulking, and installing storm windows on a home will also be featured. Following speakers, tools and materials will be available for inspection and tryout.

Instructors:

Sales Representative for Johns Manville Corporation (fiberglass insulation)
Insulation Coordinator for Public Service Company of Colorado
Dow Chemical Representative
Sales Representative for Rockwool Industries (rockwool insulation)
Director of Engineering for Solar Cell Corporation (cellulose insulation)
Istara Research Representative

Session Three

Energy Conservation Practicum

This "hands-on" session will entail splitting the class into teams of 5 to 10 persons. Each team will be assigned to a house which has been identified through one of the county winterization programs. During the session instructors will demonstrate how to complete various energy conservation measures in an actual residence and will supervise participants as they perform these functions. This experiential learning session will culminate the energy conservation sessions.

Bring To Session Three

*A sack lunch
*Tools—
Caulking Gun
Drill (Optional)
Gloves (Optional)
Hammer
Mat Knife
Measuring Tape
Pencil
Pliers
Saw (Optional)
Screwdriver
Shovel (Optional)
Staple Gun & Staples (Optional)
Tin Snips (Optional)

Instructors from:

LaGente Housing Corporation
Adams County Winterization Program
Colorado Solar Energy Association
Istara Research

Session Four

Passive Solar Energy Utilization

The use of solar energy through "passive" techniques such as landscaping, shading with overhangs, window configuration, ventilation techniques, and other methods will be discussed in a lecture and slide show. A tour of an office building and a residence that are examples of proper design for passive solar energy utilization will follow. This tour is courtesy of the Crowther/Solar Group.

Instructors from:

Crowther/Solar Group, AIA
Solar Energy Program, University of Colorado at Denver
Colorado Solar Energy Association

For the hands-on session, 10 instructors led groups at nine homes identified by a local Community Action Program and one home of a CSEA member. Groups were limited to 5 or 10 working on each house—others chose to observe.

Houses were given energy audits by instructors in advance of the workshop and evaluated as to the need for basement, water heater, hot water pipe, and attic insulation, as well as weatherstripping, caulking, and storm doors and windows. Participants were led through the same audit in the first step of the hands-on workshop.

In addition to being the most time-consuming of all the sessions, the hands-on session also had the potential of being plagued by major last-minute changes. A hot-line and supply truck answered calls for additional supplies.

> "After the workshop, we asked ourselves and participants whether the whole thing was worth it. The general conclusion was that the people learned something. But more important was the good feeling, particularly generated at the hands-on session, that came from working together to achieve a worthwhile objective. This joyful, shared experience was special."

variations on the theme

- Get together with neighbors and plan a marathon insulation day. Buy cellulose in quantity and get the blowing equipment free.
- Examine the solar potential of local homes in a community solar audit.
- Hold a hands-on workshop to weatherize buildings undergoing rehabilitation in inner-city areas.
- Help small business owners by holding workshops at factories or offices. Let them pay for materials, you supply the free labor as part of a training session.

for more information

The Homeowner's Energy Guide: How to Beat the Heating Game p. 106
$aving Home Energy: A Guide to Organizing a Hands-On Energy Conservation and Passive Solar Energy Workshop p. 153
Solar For Your Present Home p. 126
The Solar Home Book p. 100

CSEA, a non profit volunteer organization and a regional chapter of the American Section/International Solar Energy Society, is involved in community-scale solar energy education and outreach activities.

Energy Phone

Clark University students answer energy conservation questions on a toll-free telephone line.

To find out how to choose an insulation contractor, install a solar collector on the roof, produce electricity with a windmill, lower a car's gas consumption, or do anything else to save energy, residents of Massachusetts call the Energy Phone.

Thirty students from Clark University, Worcester, answer as many as 4,500 calls a month on the toll-free telephone service operated by Clark under contract to the Massachusetts Energy Policy Office (EPO).

Funded through a $60,000 grant, the Energy Phone is the first statewide service of its kind in the country. Students—each working (for a minimum wage) nine hours a week—keep the service operating 12 hours a day, every day, all year around.

When starting the project a year ago, Clark University accepted only students who had taken or were taking courses related to energy issues and technology. EPO set up for them a basic two-week training course focusing on such major energy conservation concerns as home auditing, insulation, weatherization, and alternative (appropriate) technology, particularly solar devices.

The students were not really ready, but the phone was ringing. Sometimes callers asked questions to which no one had a ready answer. Faculty members and EPO staff provided assistance with difficult questions, but obviously students had to increase their knowledge, gather information, and devise a retrieval system before cold weather spurred residents to keep the lines busy.

The students formed committees to do research and build files on important topics, such as winterizing homes and solar heating. Most of this effort was supervised by Clark's Science, Technology, and Society faculty as part of its independent study program; students received one semester hour of credit.

In one of the major projects, five students developed an easy-reference energy manual with a fact-sheet format for use on their energy hotline.

This year—having developed resources and learned what students need to know to answer the majority of queries—Clark requires students to complete a one-semester course in home energy conservation before they say hello on the Energy Phone.

While working on the Energy Phone, students meet regularly with the coordinator, Dr. Dennis Ducsik, and the Faculty Advisory Committee to discuss difficult technical questions and the special projects on which individual students or groups are working. The University schedules seminars occasionally to bring students up to date on energy issues or technical advances.

The Energy Phone has proved useful to many more people than those who have called in. The students' logs and monthly reports on questions they have answered have helped EPO pinpoint consumers' needs and, consequently, to shape state programs to meet those needs. In one case, for example, the Building Code Commission is using the students' data from telephone queries to conduct a survey of fraudulent practices in insulating homes. The survey may lead to new legislation protecting consumers.

The Energy Phone has been a big success with the students who run it, too. No one has dropped out. Some of the Energy Phone veterans found full-time summer jobs as consultants to insulation contractors and other energy-oriented firms.

Will the Energy Phone be a model for projects in other states? Perhaps, but Dr. Ducsik cautions that students must have substantial technical training and access to information to operate such a project properly. They also must have sufficient funding to pay for such necessities as telephones, work space, and office supplies.

Student volunteer groups which do not have adequate resources for such a comprehensive Energy Phone may find it feasible to undertake more modest projects. High school as well as college groups may perform a valuable service by answering local calls on one important topic, such as weatherization, for a few hours a week. Schools, utility companies, service clubs, and state energy offices have provided support for such projects in various parts of the country.

As the Clark University students discovered last year, many people want information on energy and don't know where to find it. At Clark, the bells are ringing. ☐

For hot tips on insulation, solar energy, whatever, call toll free 1-800-922-8265.
(in Massachusetts only)

Money in the house is money in the bank.
MASSACHUSETTS ENERGY POLICY OFFICE

Our lines are open from 9 AM to 9 PM, seven days a week, 365 days a year, to answer your questions on how to save money, not just energy. So whatever your question is, call us at The Energy Phone. If there ever was a hot line, this is it.

The Boycott in Buffalo

College students in Buffalo are leading the nation's first gas bill boycott and conducting research for use in reforming state utility laws.

For the people of Buffalo the winter of 1977 brought 20-foot snowbanks, untold physical and economic hardship, and record utility bills.

For the city natural gas utility, the National Fuel Gas Company, the winter of 1977 meant record-shattering profits.

When the utility asked for another major rate increase, the Buffalo chapter of the New York Public Interest Research Group (NYPIRG) decided it was time for direct action by consumers. That action led to the nation's first gas bill boycott, one which the City of Buffalo strongly endorsed.

NYPIRG—part of a national network of student-directed advocacy organizations—has been battling the utility on a number of fronts since 1976.

As background to its campaign to seek reduced rates, NYPIRG sought the right to inspect the utility company's financial records. In August of 1977 the New York Public Service Commission in a landmark decision granted NYPIRG access to the records. As a result, the advocacy group was able to delay an earlier rate hike for four months—an action that in itself saved Buffalo consumers approximately $3 million.

At the same time student volunteers from the State University of New York and State University College took the campaign to the people, going door to door collecting signatures on a petition requesting a $1.5 million rebate to consumers from the company's "excessive" profits.

When the rebate petitions did not produce results, NYPIRG asked citizens to boycott National Fuel Gas by putting their fuel bill payments in an escrow account administered by NYPIRG rather than sending them to the company.

Volunteers distributed flyers telling boycott participants what to do with their bills and held bill collection days once a week at the entrance to the company's offices. The students organized campus boycott campaigns, publicized the boycott by mail and telephone, and transported people to public hearings.

More than 700 consumers, including 100 students, joined the boycott.

The biggest boost to the campaign came this past February when the Common Council voted 12-2 for the City of Buffalo to join the boycott. A factor in the overwhelming vote was the campaigning by a council member who is a NYPIRG organizer.

When boycotters began to be threatened with cut-off notices for unpaid bills, the boycott participants met and decided to continue in a modified fashion. State law in New York specifies that shut-offs can be ordered only if customers are more than $50 in arrears. The boycotters decided to keep an amount of $17.76 unpaid in their bill as a symbolic means of continuing the campaign.

Meanwhile in Albany, the state capital, student interns from two Buffalo colleges are conducting research for NYPIRG's 1978 legislative program. The program includes legislation to provide Lifeline rates (a fixed price for the first several hundred kilowatt hours of electricity used per month, a pricing system designed to aid low-use and low-income consumers), to assure due process protections prior to shut-offs, and to establish the Residential Utility Consumers Corporation, which would work for lower rates and better service.

Working under a one-semester internship program for which they receive 12 to 16 credits, the students do research, write memos, and confer with the bill's sponsors. Past successes to which students have contributed include the NYPIRG-sponsored home insulation legislation enacted into law in 1977.

It is too soon to know whether the student volunteers working with Buffalo's NYPIRG chapter on utility advocacy projects will achieve all their goals, but they are being heard at the state capital, and at National Fuel Gas Company. ☐

For additional information on NYPIRG's utility advocacy program, contact Kenneth E. Sherman, Regional Coordinator, NYPIRG, Inc., 295 Main Street, Room 1075, Buffalo, New York 14203 (716-847-1536).

Organizing Home Repair Projects

Once a student volunteer clean-up project, the Charlottesville Housing Improvement Program provides a model for rehabilitation programs.

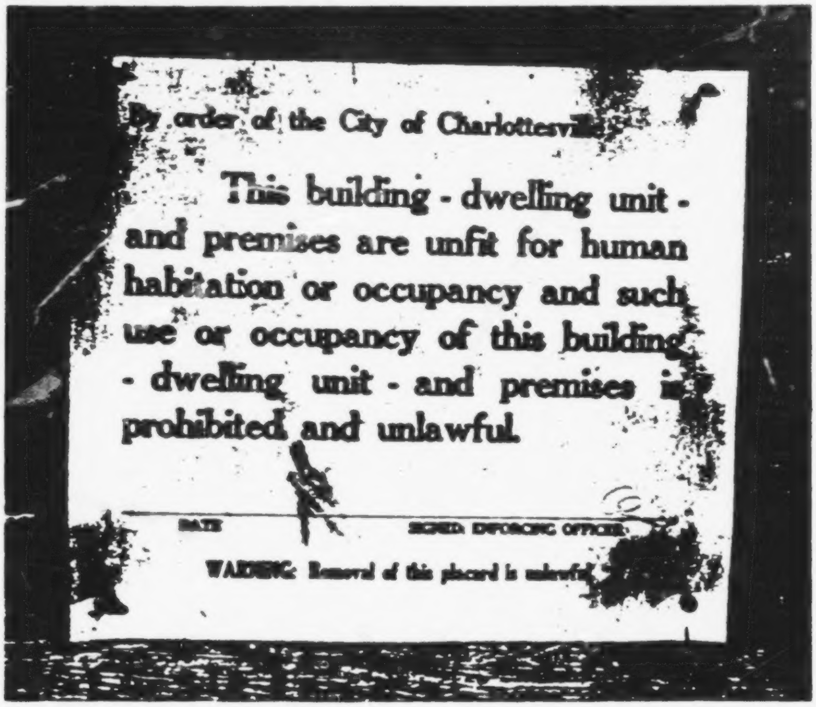
"It's just about the perfect community volunteer activity," says Rick Noble, head of Madison House, the student volunteer organization of the University of Virginia in Charlottesville. He's referring to students pitching in to rehabilitate housing for families who can't afford repairs. Often these involve weatherizing houses in order to save heating and cooling costs.

Most of the student volunteers work with the Charlottesville Housing Improvement Project (CHIP), a separately incorporated offshoot of a Madison House program which originated in 1969. Recently, under a grant from the Department of Housing and Urban Development, CHIP has produced a manual to show other volunteer organizations, or those relying heavily on volunteers, how to set up a similar program.

The basic CHIP program is simple:

- Find people whose homes are in need of fundamental repairs but who can't afford to make them at prevailing commercial prices;
- Plan the work that needs to be done and find a way to finance materials and the licensed subcontracted work (electrical and plumbing) that local regulations require and that owners cannot pay for;
- Organize volunteers under a skilled supervisor to carry out the work, with whatever help the family can supply. (CHIP uses crews of five or six volunteers and expects most jobs to take between six and eight weeks.)

Properly designed and run, a housing rehabilitation project is a valuable service-learning tool. Student volunteers develop skills that could be useful both in careers in construction and in maintaining their own homes. The families increase the energy efficiency of their homes, and neighborhood deterioration may be reversed.


By order of the City of Charlottesville
This building - dwelling unit - and premises are unfit for human habitation or occupancy and such use or occupancy of this building - dwelling unit - and premises is prohibited and unlawful.
DATE
SIGNED ENFORCING OFFICER
WARNING: Removal of this placard is unlawful

CHIP's forerunner started when University of Virginia students decided to help clean up the damage done by Hurricane Camille. The project moved from that emergency need to making repairs on housing that was deteriorating because of the owners' inability to repair it. Because of the success of this project, CHIP was established in 1974 as a nonprofit corporation with one full-time employee and a budget of $5,000. In its first year CHIP rehabilitated seven houses. In 1977 CHIP had 25 full-time employees and a budget of more than $185,000. It renovated some 40 houses.

CHIP still draws heavily on student volunteers. Each year approximately 100 Madison House workers contribute three hours each a week during the fall and spring to CHIP and its rural counterpart, the Albemarle Housing Improvement Program (AHIP).

John Taylor, who has run the program since its inception, emphasizes that any rehabilitation organization should start small with projects it can complete well, possibly with such simple weatherization projects as fixing storm windows. The organization then builds experience and credibility simultaneously, and has a much better chance of both doing a good job and holding on to its volunteers.

CHIP has found that requiring certain commitments (specified in a formal contract) of clients is essential to a good working relationship. When clients are contributing, they feel they are being helped by friends, and the volunteers feel their time has been used well and their work appreciated.

One commitment is financial. Though CHIP can arrange government grants or loans for materials and subcontracted work, the client must pay at least 20 percent of this cost. The client also agrees to help physically with the rehabilitation insofar as possible, even if the work is limited to painting the inside trim after the volunteers are gone.

Even in the early stages of a program, when all work is done by volunteers, construction work takes money for materials. (Those undertaking weatherization programs for the poor may be eligible for funding under the Community Services Administration's Emergency Energy Conservation Services. See box on this page.)

CHIP keeps cost to a minimum by using salvageable material from the building wherever possible, but the cost of the remaining materials—and of such subcontractors as licensed plumbers and electricians—must still be met. Under the Community Development Act, federal subsidies are available to local governments to use in encouraging housing rehabilitation. Charlottesville's city government has obtained a block grant which it distributes at its own discretion. Presently the city uses this money to pay up to $6,000 in materials and subcontracting costs; the remainder usually is financed by conventional home improvement loans, which CHIP helps clients to obtain.

The city also has made available a subsidy that the program earns at a rate of $10 per crew per hour on jobs that meet certain requirements. This money can be used to pay the administrative overhead associated with the volunteers' work.

In rural areas, some projects may be eligible for repair grants or loans from the Farmers Home Administration.

CHIP has found various sources of support within the community, but a record of tangible achievement often must be established before local financial assistance becomes available. Volunteer projects should not overlook the possibility of such in-kind contributions as office space, tools, materials, and office supplies, for these relieve some of the need to raise cash from outside sources.

CHIP also has tapped a different kind of grant money: federal government programs, primarily the locally administered Comprehensive Employment Training Act (CETA), that will pay salaries for unemployed or unskilled workers who receive on-the-job training. By tying into these sources, CHIP has been able to expand operations considerably. Many of CHIP's crews are now paid workers, and CHIP is a full-scale job-training program.

Under CHIP's organizational plan, much of the work of obtaining funding falls to the executive director, who also is responsible for overall management and for recruiting volunteers. The other two key positions are rehabilitation counselor and field supervisor. In small programs committed student volunteers may fill these positions, but as a program grows, full-time employees are needed.

The rehabilitation counselor's job is a demanding one, and filling it may well be the stumbling block for many would-be programs. The job description in CHIP's handbook shows why.

> The Rehab Counselor works with building inspectors, welfare and social workers, community action groups, churches, etc., to identify families which may be eligible for assistance. Once the family is identified, the Rehab Counselor contacts the family to determine whether the house contains critical deficiencies or hazardous conditions, and, if so, whether the family qualifies for HRP (Housing Rehabilitation Program) assistance.
>
> The Rehab Counselor, who should be experienced in construction, is also responsible for planning the project. He should be able to work up a plan for

Emergency Energy Conservation Services

The Community Services Act of 1974 authorizes "Emergency Energy Conservation Services to enable low-income individuals and families, including the elderly and the near poor, to participate in energy conservation programs designed to lessen the impact of the high cost of energy on such individuals and families and to reduce individual and family energy consumption."

A major component of the program supports weatherization activities which will increase the thermal efficiency of homes. Public or private nonprofit organizations and agencies that meet Community Services Administration (CSA) eligibility criteria may receive grants from CSA Regional Offices for operating projects including weatherization activities. At least 90 percent of the allocated funds must be expended on materials.

CSA Instruction 6143-1a gives the following as eligible weatherization activities: "Making home repairs and energy saving improvements to minimize heat loss and improve thermal efficiency. Components include repairs to stop heat loss through infiltration; installation of a balanced combination of energy saving home improvements, including insulation and storm windows and doors; and where needed, the adjustment and repair of heating systems."

CSA has issued *A Community Planning Guide to Weatherization* (CSA Pamphlet 6143-6) which gives the details of agency procedures governing the conduct of weatherization programs. Useful information on specific techniques and standards of workmanship is available in *In the Bank . . . Or Up the Chimney*, published by the Department of Housing and Urban Development, Washington, D.C. 20410.

Other Emergency Energy Conservation Services activities for which grants are available from CSA are:

- Crisis intervention to prevent hardship or danger to health due to utility shut-off or lack of fuel;
- Consumer information, education, and legal assistance;
- Transportation projects designed to offset the increased costs to the poor;
- Alternate energy sources, such as solar and wind power and methane digesters;
- Program support in the form of training and technical assistance, research and demonstration, and evaluation.

Additional information may be obtained from CSA Regional Offices or CSA, Washington, D.C. 20506.

In the Charlottesville Housing Improvement Program, crews of student volunteers from the University of Virginia work under skilled supervisors.

the physical rehabilitation of the house and supply an accurate estimate of materials and cost.

Once the financing is arranged and the job planning complete, the actual housing rehabilitation is turned over to the construction supervisors. The Rehab Counselor stays involved, however, to counsel the family and see that it is doing its fair share...

CHIP maintains that if rehabilitation of housing is to last, then it must be tied to rehabilitation of people. So the rehabilitation counselor must be ready and able to deal with the range of emotions and attitudes in clients who have not prospered in this society.

The other key person on the job —and the one with whom student volunteers will work most closely— is the field supervisor. Construction work can use a lot of unskilled labor, but only if that labor is guided by someone skilled and experienced. Poor planning and supervision can waste volunteers' time, and ultimately lead to the loss of their services.

The field supervisor's planning includes arranging reliable transportation to and from the job, sufficient materials and tools to complete the work, and work assignments that make full use of volunteers' time and skills.

Because the field supervisor must know students' capabilities and must supply continuity to the job, the same supervisor should see a job through from beginning to end. As much as possible, a given group of volunteers should work with the same supervisor from one job to the next.

Obviously, the supervisor's planning depends on knowing how many workers with what skills he will have on a given day, so volunteers must make firm commitments, if possible for a regular schedule of work sessions so that the same crew can be kept together from one work day to the next. Such continuity makes the supervisor's scheduling job easier and speeds up the work.

If the field supervisor demonstrates and supervises properly, the students will learn many useful skills, waste no time standing around, feel needed, and come back to work another day.

Work usually is carried out by crews of five or six workers. In larger operations, there may be an advantage in some degree of specialization; for instance, one crew might do all roofing work.

In deciding what repairs should be undertaken, CHIP gives top priority to the roof and the bearing structure of the house. The CHIP manual recommends a basic goal of increasing the useful life of the house while removing clear deficiencies, hazards, and building-code violations. It warns against the impulse to "fix up" housing just enough to meet housing codes or to make only cosmetic repairs. Student volunteer programs should take care to concentrate their limited resources where they will do the most good.

In some cases rehabilitation is not practical. CHIP advises that a structure not be considered for rehabilitation if "more than 25 percent of the structural members comprising the floor, the bearing walls, and the roof are *suspected* to require replacement." A housing inspector can offer assistance on this question.

It is not easy to start or carry on a program like CHIP. In assessing the reasons for its success, those who have worked with it over the years return repeatedly to the need for sound, dedicated leadership and committed student volunteers. Thanks to both, hundreds of families in Charlottesville now live in warmer and safer homes.

CHIP's manual, Housing Rehabilitation: A Community Solution to a Community Problem, *may be obtained by writing to the Charlottesville Housing Improvement Program, 170 Rugby Road, Charlottesville, Virginia 22903.* □

III. Energy & Education: Teaching Energy Conservation

The educational community's response to the energy crisis has produced a concerted effort to reach young people by infusing energy conservation into the curriculum. By adapting flexible learning/teaching strategies, the public schools -- particularly the high schools -- are aiding in the development of America's new energy conscious ethic.

In a great many instances, public schools are encouraging students to examine the energy needs of their own schools. School energy audits and home energy audits demonstrate the correlation between energy conservation as taught in·the classroom and energy conservation as practiced in the community.

Institutions of higher education are also involved in alleviating the energy crisis. According to the latest survey conducted by the Solar Energy Research Institute and published as The Solar Energy Education Directory, practically every college and university in the nation offers energy-related courses.

Therefore, this section illustrates the impact of energy education on the classroom. A chapter from the Community Services Administration's Energy Education Guidebook, further demonstrates that a public school building audit is not only an educational activity, but an extremely practical one -- one which can save the school system thousands of dollars.

Energy Crisis Is Making Impact In Classrooms and Textbooks

By JAMES FERON

WHITE PLAINS

TO the compartments of our lives affected by the energy crisis, add education. Students who once saw energy and power only as academic subjects are now building solar panels, monitoring fuel bills and preparing classroom arguments for and against nuclear power. They are taking the subject home and returning with new questions.

Teachers, in turn, are attending seminars and seeking educational materials to prepare themselves for a complex and rapidly developing subject. More than 1.5 million energy-related booklets were distributed to teachers by the Department of Energy in the last 12 months, "the majority at their request and one to a classroom," an official said.

come a multimillion-dollar national effort. It is being "infused," or folded into curriculums, rather than "tacked on," according to Dr. Helenmarie Hofman, associate director of the Project for an Energy-Enriched Curriculum at the National Science Teachers Association. "Teachers who've had to cope with Career Ed, Drug Ed and Sex Ed don't need Energy Ed, too, but they do want to teach it," she said.

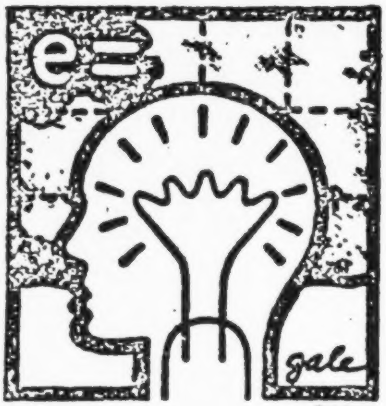
They are teaching it, in some cases, because they always have, or because the school district has received a state or Federal grant, or because students are asking about it. They are also teaching it in some cases because state officials are insisting that they do.

Edward H. Borque, assistant superintendent for instruction in the Fairfield, Conn., public-school system — 9,000 children in 16 schools — spoke of his district's growing energy-education program, and its origins and its future. "It's no educational fad," he said.

"We have programs in 6 of the 12 elementary schools, including a 'power quiz' at home," he said. "The children go through a checklist with their parents — how energy is used, how it might be wasted, etc. Starting in December, we'll include a 15-hour course in the science program. By September of 1980 we will have developed an interdisciplinary program for the intermediate level."

In addition to staff and community interest, he said, "there is a great deal of pressure from the State Department of Education for us to do this, and from the Governor's office." There are also practical energy issues to deal with. "We keep hearing talk about proposed recommendations to save fuel by closing schools in February, cutting down on field trips or banning students driving to school," he said.

New York State's Department of Education, with help from the Federal Department of Energy, has developed more than 40 solar-energy demonstration projects and is field-testing them in the classrooms of 30 states, according to Thomas Boehm, an associate in science education in Albany. More than $125,000 has been spent so far, he said, but "we are seeking new funding to expand it because we don't think the teaching of solar should be restricted to science."



Bob Gale

The projects range from the active — "Solar Energy in a Coffee Can" — to the passive, or how a roof overhang lets the low winter sun in while keeping the higher summer sun out. The exercises were developed in an exchange between experts from the Atmospheric Sciences Research Center at the State University of New York in Albany and a group of science teachers.

One of the teachers was Thomas O'Day, science chairman of the John Jay junior and senior high schools in Katonah, N. Y., who had introduced

Continued on Page 16

The New York Times, Sunday, November 11, 1979

THE NEW YORK TIMES, SUNDAY, NOVEMBER 11, 1979

Energy Crisis Enters Classroom

Continued from Page 1

energy as part of an environmental course in 1970. The subject took on special meaning in 1973, with the first fuel crisis, and it continues to make an impact.

"We began collecting energy data — electricity, oil and gasoline consumption — and from that sprung a systemwide energy study," Mr. O'Day said. The data collection by students led "to the school's oil bills" and into a conservation agreement with administrators, custodians and teachers. The result, which included a professional oil-burner upgrading, "has been a 28 percent reduction in the school district's fuel consumption since 1973," he said.

Thus the study of energy in this district of 3,800 students has gone beyond the instructional field and become a part of student and community life patterns. Students have not only helped build solar panels and solar cookers — "we do hot dogs," Mr. O'Day said — but also helped reduce school costs.

This is no small matter for any tax district where cost-conscious voters can reject school budgets as an expression of discontent. Government officials recognize this, in New York and elsewhere, and often seek to couple the teaching of energy with practical beneficial results.

David K. Richard, senior architect of the Management Services Section of the State Education Department's Bureau of School Structural Planning, said that since 1973 "fuel consumption in the state's schools has been reduced by 20 percent, in part through energy-conscious operation often inspired by students and teachers."

The ease with which students and teachers can translate the study of energy into daily experiences has delighted educators, some of whom see the burgeoning interest producing good results.

"Kids will be able to make more intelligent decisions when they get to the polls and they'll know it's not necessarily true that 'everything will be nuclear' or 'everything will be solar' in the future," a state educator said. "And who knows what all this classroom work will produce? Who knows what's going on right now in some student's basement?"

The new developments could come from a school like the Bronx High School of Science, where a new solar-collector energy system has been mounted on the roof by a division of Exxon Enterprises Inc. at a cost of $78,500. It is heating an average of 1,000 gallons of hot water a day, at an estimated annual saving of $2,000.

The New York Times / Suzanne DeChillo

Instructor Tom O'Day and Laura Bradell construct solar panel at Cross River, N.Y., school

It is also serving educational needs, according to Lawrence Finkelstein, chairman of the physical science department. "Students have been building energy projects here for years," Mr. Finkelstein said.

He said interest in energy was intense now, and this had great possibilities because "the focus on energy leads to all things." Young people, he felt, were "a bit hesitant, however, about one aspect of energy: the nuclear process. They were unhappy about Three Mile Island; they see lots of problems."

Donald D. Duggan, chief of the academic programs branch of the Department of Energy in Washington, indicated that the nation's energy teaching was still largely a local matter, with the states adding relatively little to the funds provided by an ambitious Federal program.

"Our programs for elementary and secondary schools cost $3 million a year," he said, adding that it was a fraction of the "major bloc funding of the Office of Education, which spends hundreds of millions of dollars a year." The funding of academic programs covers curriculum development, teacher training and special activities, he said. The Department of Energy also spends a part of its state-grants programs, perhaps 15 percent of an annual $50 million, on education.

The department's "immediate audience is the teacher rather than the student," Mr. Duggan said. "We reach about 10,000 teachers a year in training programs." Much of the department's emphasis appears to be in the solar field, where teachers indicate that much of the student interest resides.

The Department of Energy subsidizes four regional centers to promote solar energy, in Cambridge, Mass., Portland, Ore., Minneapolis and Atlanta. Their officials have also experienced the increasing demand for educational materials and are happy to provide them.

Dr. Jerome B. Skapof, the solar-education specialist in the Cambridge center, said there are approximately 10 million children in kindergarten through the 12th grade in the nine states the center covers. "That means there are about 600,000 teachers and probably another 11,000 administrators and other school personnel," he said. "That's a fantastic multiplier group."

Many states, he said, had "already mandated, or will mandate, energy education." He said it should not cost much "because we are using infusion models — no new structures, no new teachers, no new classes." Energy education, he indicated, is "becoming integrated in a real way. Kids are not learning '12 Facts About the Sun' but 'Why We Need to Get an Energy Bill Through Congress.' "

Dr. Hofman of the National Science Teachers Association said that Dr. Skapof's example was appropriate. "We've suggested that social-studies teachers can use 'How an Energy Bill Becomes Law' as a means of teaching the legislative process."

The suggested energy example, and others, can be found in new materials being prepared by the association and distributed free by the United States Department of Energy, Technical Information Center, P.O. Box 62, Oak Ridge, Tenn. 37830.

Energy had been handled in the traditional scientific way, Dr. Hofman said: "What is energy? Its work. But then it began to come up as current events, and soon it was related to environmental and economic aspects. Now it is part of everything."

She said that some teachers were using it in mathematics lessons, beginning with a simple subtraction and then moving into fractions and beyond. "They'll use this: 'An uninsulated home used 1,600 gallons of fuel a year. With full insulation it used only 900 gallons. How much was saved?' "

The class then moves into family income and the portion spent on fuel for heating, Dr. Hofman said. It is then only a short step, and an easily identifiable one, for a student — now in another class — to examine his own family's energy costs. ■

Three in E3

In three Energy, Economics, and the Environment projects, junior and senior high school students measure home heat loss, educate the public on energy use, and install a solar collector.

Using devices as diverse as infrared thermometers and solar collectors, three student volunteer groups in southeastern Pennsylvania are promoting energy conservation in their communities. Part of a comprehensive federally funded program named Energy, Economics, and the Environment and referred to as Project E3, these three projects demonstrate some of the ways junior and senior high school students may work toward the solution of local energy problems. (Other schools may apply for grants to initiate similar programs through their state education departments. For additional information on Project E3 and sources of funding and assistance, refer to the box on the the following page.)

Thirty-five gifted juniors and seniors from Ridley Senior High School, Folsom, are surveying homes for energy-inefficient structural features and advising owners on how to make their homes more energy and cost efficient. Called Project DETECT, the program is one of a series of non-credit workshops offered through the school's learning enrichment program.

With the bulk of a $1,000 grant from E3, Project DETECT volunteers purchased a $900 infrared thermometer. Because this gun-shaped instrument reads and records the temperature of objects at which it is aimed, students can use it to locate uninsulated wall areas and heat-leaking sections of the house. The volunteers' main tool, however, is a seven-page check list which each applicant fills out and sends in before students go to the home with the thermometer.

The temperatures and information from the check list are fed into the school's computer system to calculate the cost of insulation and other energy-saving improvements and to determine how long it will take homeowners to recover their investment through the fuel saved.

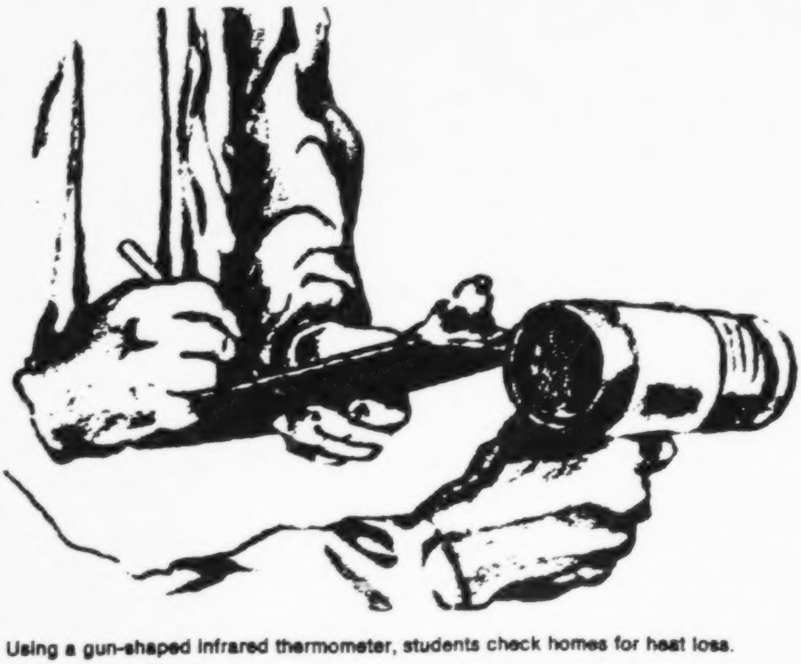
The volunteers divided into three teams: one to conduct the surveys, one to do the calculation on the computer, and one to handle publicity. The publicity team prepares folders with energy-saving tips for customers and puts out a monthly newsletter for all the schools in the district. Students also go into the community to give talks and a slide/tape presentation. The volunteers do about 80 percent of the work after school. Last winter during the peak period each student devoted an average of 10 hours a week to the project.

DETECT teams began surveying homes last January and continued through the heating season. During the first—and busiest—month they went out to more than two dozen homes in the school district. The students tried to concentrate their efforts on helping senior citizens, but anyone who requested a survey was eligible. Initially the volunteers had to knock on doors and overcome homeowners' skepticism as to the value of the students' services, but the public soon responded enthusiastically to the volunteers' work.

So did other schools. Educators from all over the Mid-Atlantic region read newspaper articles about DETECT and inquired how to start similar programs. Nick Ignatuk, the teacher who is co-leader of DETECT, points out that student volunteers do not have to have expensive instruments to operate worthwhile home energy auditing projects. The type of survey conducted by DETECT could be done without an infrared thermometer, though the inspection of homes would take longer. Calculations could be done with a pocket calculator rather than a computer.

Educating the public about the current energy crisis and possible solutions is another E3 approach to energy conservation.

The year before last 32 students in the Science Club at Upper Moreland Senior High School, Willow Grove, developed a survey to evaluate the level of energy awareness in their school district. From a sample of more than 800 respondents, the students determined specific subject areas on which both students and adults needed educating. The volunteers then spent a year developing a slide/tape presentation



Using a gun-shaped infrared thermometer, students check homes for heat loss.

to give in science and social studies classes and at meetings of local service organizations. Most of the work was done after school and during the summer.

The volunteers began by gathering pamphlets, newspaper clippings, and other information for a research center. They then divided into five groups, with each group responsible for researching, writing, and obtaining slides for a major section of the presentation: the introduction and conclusion, coal, oil, nuclear power, and minor energy sources (solar, geothermal, wind).

The presentation consists of two parts. Part I, called "Power for the People," describes the present energy dilemma and possible solutions using available technologies. Part II, "Power for the Future," explores alternative technologies—solar, wind, geothermal, nuclear energy. Since completing the initial presentation in February, the students have updated and edited the tapes and slides. As new members join the project, they help with the updating.

Through an E3 project in an inner-city neighborhood of Philadelphia, junior high students are helping to prove that solar energy in the home can be a viable alternative to gas and electric heat. Sixty seventh and eighth graders at Rhodes Middle School helped the Allegheny West Foundation, a private nonprofit group, renovate two abandoned row houses into one four-bedroom home and installed a solar thermal collector for hot water heating as part of the renovation. The thermal collector was purchased with their $1,000 E3 grant.

Students in two science classes at the school undertook the project. In their classroom preparation, the students conducted experiments with solar cookers, solar cells, and other equipment to learn more about the solar energy process. They also made braces to support the collector, and everyone was given a chance to practice hooking it up before the actual installation in May.

The students worked closely with Allegheny West, which spent $20,000 renovating the house as a community service and will sell it for much less to a low-income family. The students were involved in all aspects of planning the project and were represented on the Community Advisory Committee that met monthly to evaluate, offer assistance, and give direction to "Operation Solar Home."

This school year the students will be helping an electric company do a study with a monitoring device to see how much money has been saved by using the collector. They also are planning to take slides of the house and the solar installation so that others can learn from their work. □

Project E3

Energy, Economics, and the Environment (Project E3) encourages students to confront community energy problems through action-oriented interdisciplinary activities. Fourteen elementary and secondary schools within a five-county area in southeastern Pennsylvania currently have E3 Local Action Programs (LAP's) in their schools.

The project, which began in October 1976, has a three-year grant under the U.S. Elementary and Secondary Education Act, Title IV-C, administered by the Pennsylvania Department of Education. Approximately 10 to 15 grants of up to $1,000 each are awarded each year to both public and non-public schools in the area. The administrative responsibility for E3 is assigned to the Montgomery County Intermediate Unit, an intermediary body between the state and local school districts which handles multi-county education programs. Those wishing to initiate a similar program should contact their state departments of education about submitting a proposal for ESEA, Title IV-C funding.

Project E3 provides consultant services on training, evaluation, and curriculum design. It also operates the E3 Resources Center, which gives students, teachers, and community members information on energy and the environment. The main emphasis, however, is on Local Action Programs, most of which are on the junior and senior high level.

E3 is a spin-off of Knowledgeable Action to Restore our Environment, better known as Project KARE, a national environmental model program from which E3 adopted its objectives and approach and with which it shares personnel and offices. KARE was developed and refined in 75 schools in southeastern Pennsylvania during 1971-75. In 1975 the U.S. Office of Education and the Pennsylvania Department of Education selected KARE as an exemplary demonstration project. More than 200 schools throughout the country have adopted the program in the last three years.

KARE is part of the National Diffusion Network set up by the National Institute of Education and the U.S. Office of Education to fund programs that have proved successful on a developmental basis. To assist schools in establishing LAP's, KARE provides Action Training Workshops and curriculum guides on such topics as water and air pollution and electric power generation. The director hopes to get E3 into the Network and set up training sessions for energy projects. In any case, the staff is producing a 16mm film of their projects to show to other schools interested in how E3 works.

For further information on Project E3 and Project KARE contact: Matthew M. Hickey, Project KARE, Montgomery County Intermediate Unit No. 23, McGinnis Office Building, Route 73 and Butler Pike, Blue Bell, Pennsylvania 19422 (215-643-7600).

Although targeted to the high schools, the techniques in the following chapter reprinted from the Community Services Administration's Energy Education Guidebook can easily be adapted to a college dormitory, sorority or fraternity house setting.

CHAPTER IV

ENERGY CONSERVATION IN THE SCHOOL

This chapter outlines ways in which energy conservation can be implemented in schools. Local PTAs, school administrators and CAAs interested in involving their community school in energy conservation will find topics such as energy audits and ways of reducing school fuel consumption discussed. Formation of an energy task force for a school is suggested as a means of organizing and implementing energy conservation measures within the school. A CAA could become an active agent in the formation of such a task force.

With energy being the single most inflationary cost in most school budgets, there is a chance that the budget for instruction could be sacrificed because of rising energy costs. Any parent, community leader, CAA, PTA, or school administrator concerned with the impact of energy costs on their local schools will find advice in this chapter on how to take the first step in meeting the problem.

A. INTRODUCTION

Many existing school facilities in our country were built in the fifties and early sixties. By present standards for energy conservation, a sizable percentage of these schools have outmoded equipment and, in lieu of the energy crisis, were poorly designed. Heating, cooling, ventilation, lighting and hot water use account for the bulk of energy consumption in most schools. Technological advances in lighting controls and heating and cooling equipment now provide opportunities for schools to upgrade their energy efficiency and in turn save money. Changes in operational procedures such as heating/ventilating periods or classroom use can bring substantial savings as well. However, before one can begin taking steps in this direction, it is essential that you know what the school's present energy consumption pattern is and what quantity of energy (e.g., electricity, oil, coal) is being consumed. This quantification of a school's energy use is called an energy audit. There are several kinds of energy audits and a number of private as well as state and federal agencies would be willing to help you conduct one. The energy audit is useful because it can pinpoint the less obvious areas of energy consumption within a school. Corrective action can be suggested which may cost little or nothing once the wasteful and energy inefficient practices have been

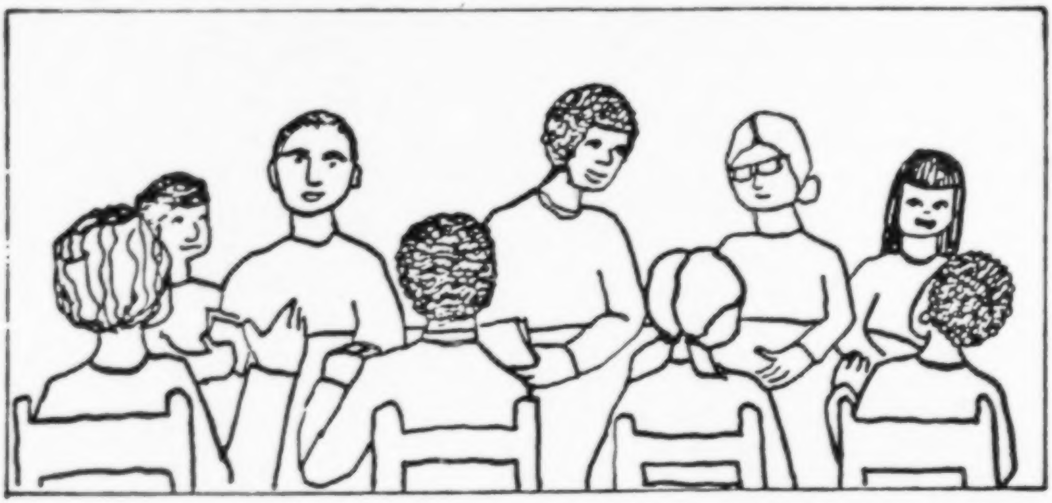
From: Energy Education Guidebook, CSA, 1980

determined. Often students can be brought into the school's energy conservation effort, helping the school implement the program. Each of these steps will be briefly discussed in the remaining sections of this chapter. If you feel ready to begin a school energy conservation program after studying this chapter, be sure to contact your State Energy Office for details on potential funding of energy audits and energy conservation measures.

B. COORDINATING AN ENERGY AUDIT

1. Step 1: Planning/Task Force Coordination

The development of a task force that can address the energy problem at your school is a sound first step. The committee could be organized by the principal of the school or by the local PTA in cooperation with the principal or, perhaps, by a CAA. Its director should be somewhat knowledgeable about energy and have had previous experience in coordinating and managing projects. This task force could also include the maintenance officer/manager of plant operation, and the managers of school transportation and food services. Interested teachers, students and parents could also be selected as representatives on the task force.



The major purpose of the task force would be to "get the ball rolling". The task force could help initiate the energy audits, help organize and set priorities for low-cost energy conservation methods at the school, and possibly develop activities for teachers and students to be undertaken on a year-round basis. Officials from state and federal school energy conservation programs could be invited to attend meetings and provide advice on strategies your school might take.

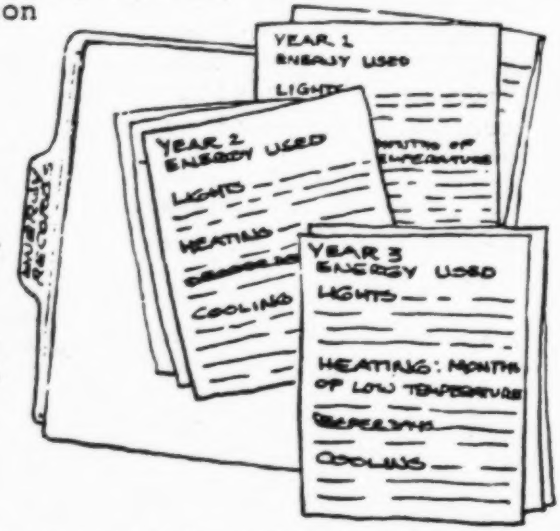
2. Step 2: Energy Audit

Initiating an energy audit in the local school should become one of the most important priorities for the task force or committee. A low-cost, "mini" energy audit is a good beginning. Usually a team of specialists will walk around the school's facilities looking at the building with a critical eye, asking the following questions:

- How many square feet of roof surface area?
- How well insulated are the roof and walls?
- How efficient is the school's heating, ventilating and cooling system?
- What is the school's operational schedule? When is the heating turned on or off? Is the building open nights or weekends?

These and other basic questions that could relate to energy consumption are analyzed.

To conduct an effective audit, the energy consumption for the past two or three years and cost of energy for your school are also needed. By knowing what the historical energy consumption has been at the school (past two or three years) and what the present energy use is (e.g., on a monthly basis), you will be able to pinpoint the most significant and inefficient areas of energy use at the school. Also, as you make progress in the school's energy conservation efforts, you will be able to rate your success by comparing present energy consumption with that of the past.


ENERGY RECORDS
YEAR 1
ENERGY USED
LIGHTS
MONTHS OF
TEMPERATURE
YEAR 2
ENERGY USED
LIGHTS
HEATING
COOLING
YEAR 3
ENERGY USED
LIGHTS
HEATING: MONTHS
OF LOW TEMPERATURE
COOLING

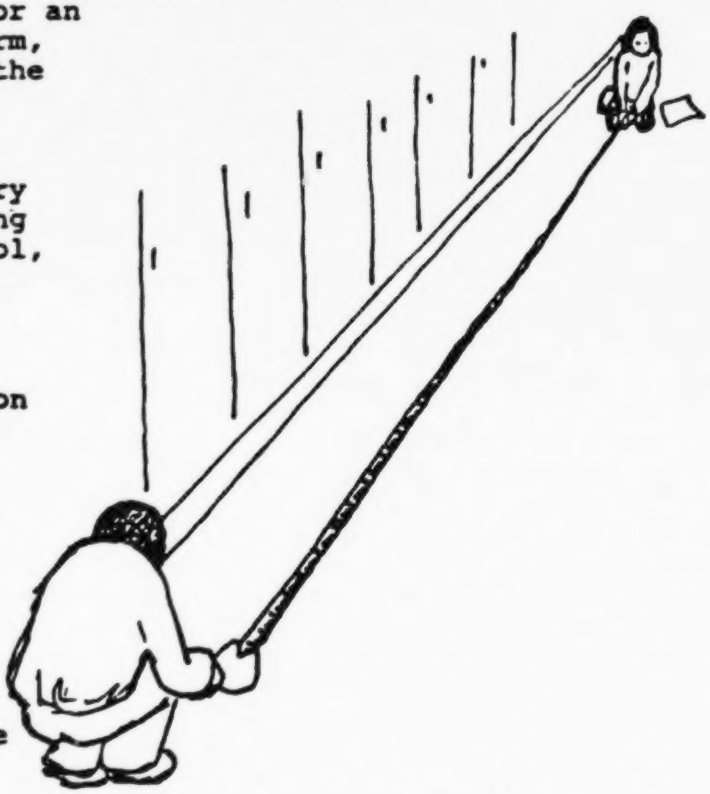
Other relevant data to be compiled would include the severity of the winters (measured in "degree days"), the number of square feet in the school, and the number of students attending the school. A basic monthly or annual analysis would include:

- fuel energy consumed per square foot of school (BTUs per square foot);
- fuel energy consumed per student (BTUs per student);
- fuel energy consumed per degree day (BTUs per degree day);
- fuel energy consumed per hour of operation during different parts of the day (BTUs/hr);
- energy cost per square foot, per student, per degree day, per hour of operation.

Some of this data could actually be collected and compiled before the on-site mini-energy audit. General science students could do the analysis.

A more complicated and sophisticated maxi-energy audit is a logical extension of a mini-audit. A maxi-audit is conducted by an engineer or an engineering consulting firm, and a fee is charged for the service. The analysis would include:

- a complete inventory of the energy consuming equipment in the school, their operating efficiencies and hours of use;
- specific construction details of the entire school building;
- a complete analysis of all the control equipment for the heating and cooling equipment in your school. For example, how many thermostats are used and where are they located;



- how much certain energy conservation modifications would cost (e.g., insulation at the roof level) and how long the pay-back would take because of energy savings obtained;

- a calculated energy budget goal for your school as well as the school's present deviation from the goal;

- and a suggested prioritized list of actions that could be taken to reduce energy consumption in the school and help the school reach the energy budget goal.

Over the next three years, approximately $950 million* will be available through this program to schools and hospitals that want to do energy audits and install energy conservation/weatherization materials. Approximately $25 million will be available for audits, with the rest going for equipment purchases, engineering analyses, etc.

All funding for this program is available through State Energy Offices. Within each state, no less than thirty percent of the state's funding is to go to schools, with no less than thirty percent to hospitals, while the remaining forty percent is split up among schools and hospitals according to the state's priorities.

The State Energy Offices set priorities as to which schools get weatherization grants and follow state as well as federal guidelines in doing so. For information on obtaining such a grant, contact your State Energy Office or Mike Willingham, Institutional Buildings Grants Program, Office of State and Local Programs, Department of Energy, Washington, DC 20585, 202/376-4149, who can also provide you with a complete list of State Energy Offices.

3. Step 3: Low-Cost or No-Cost Energy Conservation Measures

The third step will be the implementation of the school's energy conservation program. The local energy task force can play a significant role at this point in determining which energy conservation measures should be undertaken first, based on the mini- or maxi-audit. The specific activities chosen will very likely include some of those in the following list. Realize, however, that the unique characteristics of a particular school will affect the final selection and priority.

- Reduce building temperatures during holiday and weekend periods. This can save a tremendous amount of energy, through a simple readjustment in the operating schedule.

(*DOE, Institutional Building Grants Program, See Organizations Listing for more details)

- Switch to a night heating cycle before the school closes for the day. If the school holds evening classes, attempt to schedule them so they fall on the same night and/or within the same area of the school. Then, if possible, heat or cool only the zone in use.

- Schedule custodial care during the day instead of at night in order to reduce heating during the evening. Teach the custodial staff to monitor thermostats and other control devices and report to the maintenance officer if anything seems amiss.

- Reduce the temperature in specialized areas such as gymnasiums and auditoriums. In the case of P.E., instructors can be asked to hold classes outdoors during warm weather whenever possible, allowing the shut-off of air-handling units and lights.

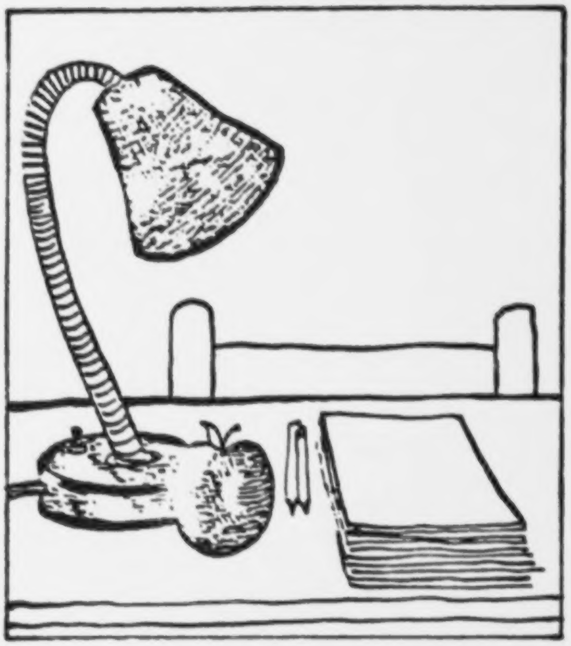
- Reduce outside ventilation to the fewest air changes per hour allowed by state and local codes. Also, do not allow the ventilating system to take in any outside air during the first hour of operation. There is plenty of fresh air in the school if it has been empty for 12 hours.

- During the heating season, close off all vents to air conditioners, which can serve as a major source of heat leakage for the school. Close all other air vents which cannot be regulated.

- Keep burners adjusted for as high a combustion efficiency as possible. A quarterly monitoring schedule (e.g., once at the beginning of the heating season and once midway through the winter) of the combustion efficiencies would be valuable. If possible, send maintenance personnel to workshops and classes on the maintenance of heating equipment. A number of maintenance courses are being offered by some state energy programs free of charge.

There are some energy conservation techniques/methods that will cost some money but will have a rapid pay-back. Those methods applicable to a particular school would be highlighted in the maxi-energy audit. It is likely that one or more of the following would be appropriate to most schools:

- Wherever possible, convert to fluorescent lighting. Also, replace existing fluorescent tubes with new tubes called "energy savers," designed to save 15% in energy consumption with a negligible change in the light level. Develop a maintenance schedule to keep all light fixtures clean. Introduce task lighting where possible. For example, purchase small desk lights for teachers so classroom lighting can be turned off when the teacher wants to study but the class is not in session.



- Install timers to control the heating, ventilating, cooling of gym, auditorium and other special activity areas. Timers to activate/deactivate the total school heating system should be worth the investment as well.

- If there are rooms in the school used more often at night than other rooms (such as the board room or meeting room), space heating and cooling systems could be installed for only these rooms. The entire school does not have to be heated or cooled because one or a few rooms are used.

- Install automatic door-closing devices and make sure doors are well sealed around their perimeters. This improvement can lead to a rapid pay-back for the cost incurred.

- Reposition thermostats that may be located near drafty areas and therefore give false readings.

- If a school has steam boilers, then the installation of gas or electric water heaters would allow the complete shutdown of the boilers during the summer. Also, the shutdown of the boilers reduces heat leaks that place an extra heat load on air conditioners.

- Check the boiler's burner nozzle for efficiency. Replace it if it is undersized/oversized or worn with age. This simple adjustment can lead to phenomenal energy savings. Also, treat the boiler water chemically to reduce scale and thus increase the boiler's heat transfer efficiency.

- Many pre-sixties school buildings were built with high classroom ceilings. Since hot air stratifies at the top of these rooms, the school's heating system is overworked heating air at the occupant level. Dropped ceilings in these classrooms, using suspended aluminum frames and insulated ceiling boards can substantially reduce the space in the classroom that has to be heated. Heat transfer through the ceiling can be reduced as well.

- Some older school buildings were originally built with no roof insulation. A maxi-energy audit may specify a rapid pay-back if roof insulation is undertaken.

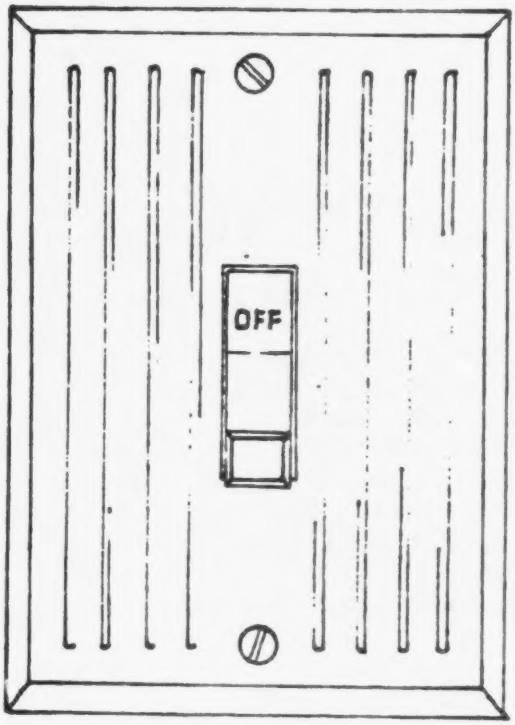
4. Step 4: Student Involvement

Student involvement in an energy conservation program at a school could help in a number of ways. Students could aid in collecting data that in turn could be used by the individuals conducting the mini- or maxi-energy audit. Since many of the same principles apply when conducting an energy audit of a school or home, students could also be taught how to perform energy audits of their homes. They could help in actually implementing certain energy conservation measures at the school and in their home. Their enthusiasm, if sparked, could add to the general overall morale needed to keep an energy conservation program going at the school. And finally, those students who become interested and involved are apt to carry their concerns for energy conservation into their adult lives and the community.

Data Collection: It is often valuable to energy auditors to know how warm or cold the various rooms in the school are at a specified time. This data could help in determining how efficiently the school's heating system is working, how well insulated the various rooms are and whether thermostats are set and physically positioned properly in the rooms. A class could be organized to take and record the building's air temperature in various sections of the school at the same time. A number of classes could be scheduled to record the temperature at differing times of the day throughout a week or two. This data collection should be coordinated with the plant operation manager of the school, to help him compare his data on boiler operation with the actual heating performance data of the school.

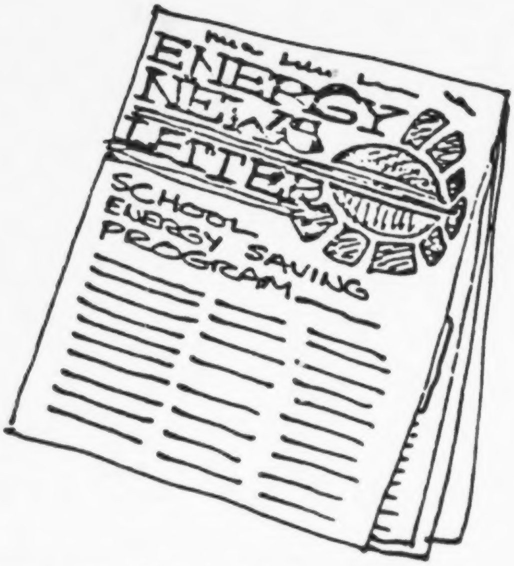
Classes could also survey rooms for lighting usage, e.g., whether lights are kept on in unused rooms and whether they are left on after school hours. A survey of lighting in the school could quantify any misuse and pinpoint zones in the school where corrective action could be taken.

Students could also chart the electrical kilowatt hour consumption of the school, as outlined in Activity # 11 in Chapter V. If the kilowatt hour charting was, in turn, tied to the lighting survey of the school, the students would find it easier to associate the theoretical analysis (kilowatt hour consumption) with the reality (percentage of rooms lit but unoccupied). A possible outgrowth of the kilowatt charting and lighting survey might be a concerted publicity campaign within the school directed to the goal of turning the lights off when not in use. Certain students might be placed in charge of turning off lights when leaving the classroom and turning off any solitary lights they see burning. It is very possible that an effective campaign stressing light use management could lead to a substantial reduction of electric usage.



Further Motivational Activities: Another approach to motivate energy conservation among students and teachers would be the development of activities which stress the subject in class. For example, poster contests could be held on the topic, "The best way to conserve energy at our school." Winning posters could be displayed in the hallways of the school or in local store windows.

Students could develop a questionnaire as a class project to survey student and teacher opinion on the various means of conserving energy at school. The results of the survey might be published through an energy newsletter coordinated by the students, or through the student newspaper. Some of the better suggestions might be acted upon by the school administration and/or energy task force. (Suggested as Step 1 in this chapter.)



- There are many activities outlined in Chapter V which, if undertaken in class, would help educate students on energy conservation and alternative energy production. For example, one of the outlined activities is the construction and use of insulative curtains. In some cases, insulative curtains might be used in school classrooms or administrative offices and could be made by students, e.g., in home economics classes. Solar and wind energy demonstration projects described in Chapter V can also serve as a means of motivating and interesting students on the general subject of energy.

C. RECAP

In summary, any school can conserve energy and save money. The sooner a school makes a concerted effort in this area, the sooner will benefits be seen. A specific program of action can evolve from the students, while technically based suggestions would be made by the mini- and maxi-energy auditors and the members of the energy task force organized at a school. State and Federal officials who are concerned with energy conservation will be able to provide advice, and sometimes matching grants, for school projects. With the certainty that energy prices will continue to rise, there is no better time to begin than now.

NOTE: A number of the ideas presented in this chapter were adapted from Energy Action Now by Dr. Yale Stenzler, Deputy Director of the Interagency Committee for State Public School Construction, Annapolis, Maryland.

IV. Funding Sources

In this section we include an excerpt from, "A Selected Guide to Federal Energy and Education Assistance," published by the U.S. Department of Education. A very useful booklet on federal funding availability, it gives an overview of the granting situation agency by agency. Of course the best single source on federal assistance is the massive compendium, Catalog of Federal Assistance, well worth studying one rainy afternoon at the public library. However, with more and more federal dollars available for innovative energy conservation projects, we recommend you read the Organizations Bibliography at the end of the package. This will give you additional information on federal assistance for energy-related projects.

We also include in this section an excerpt from a Community Services Administration publication. The chapter entitled "Other Funding Sources," indicates that the private sector, including utilities and foundations, are receptive to funding energy programs with a community focus.

Other funding guides are referenced in the Resource Bibliography at the end of the package.

Agency: ACTION

Title of Program	Purpose Objective—Descriptive Information	Types of Assistance	Authorizing Legislation	$$$$ FY 79	Who May Apply?	Information and Application Contacts	OMB #
VISTA, University Year for Action, Retired Senior Volunteer Program, Youth Challenge Program	To provide volunteers who assist in winterization and insulation, in education efforts to teach energy saving methods, job training and placement with solar construction, greenhouse cooperatives and in legal areas concerning utility rates, pollution standards, etc.	C,E,G, In-kind personnel services	1973 Domestic Volunteer Service Act	Est. 1 mill. on energy outreach and related programs.	Community agencies, public and private non-profit agencies	ACTION State Offices In D.C.: Margery Tabankin Director, VISTA & ACTION Education Programs 806 Conn. Ave. NW Wash. D.C. 20525	72.002 through 72.004 72.009
National Center for Appropriate Technology	To support a small grants program for community demonstration projects in energy conservation. (Solar, Wind, Methane.) To support an extension staff of 10 outreach workers. To support a staff of 25 Engineers and architects who develop and test Technologies, write technical reports and provide assistance to groups involved in appropriate technology endeavors. To support research and information dissemination activities.	A,C,D,E,F,G		3 million grant from CSA	Community action agencies, Community Development corporations and other community based groups	Edwin C. Kepler Executive Director NCAT, Box 3838 Butte, Montana 59701 406-723-6533	
Agency: Community Services Administration							
Emergency Energy Conservation Services	To involve low-income individuals and families (including the elderly and the near poor) in programs that promote energy conservation and seek to lessen the impact of the high cost of energy.	C,D,E,G,		$265 mill. total budget; for Conservation Education there is a set-aside for 1.0 million	Community Action Agencies, State Economic Opportunities Offices, non-profit Community Development Corporations and other public and/or private non-profit organizations and agencies that meet ESA eligibility criteria.	Regionally or locally: Community Action Agencies, Community Action Programs or Community Development Councils or Regional Community Services Administration offices. State offices of Economic Opportunity; In D.C.: Richard M. Saul, Offices of Community Action, Community Services Administration, Wash., D.C. 20506, 202-254-5460	49.014

From: A Selected Guide to Federal Energy and Education Assistance, Energy and Education Action Center, U.S.O.E., 1980

Agency: Department of Agriculture

Title of Program	Purpose Objective–Descriptive Information	Types of Assistance	Authorizing Legislation	$$$$ FY 79	Who May Apply?	Information and Application Contacts	OMB #
Cooperative Extension Service	To provide educational programs based upon local needs in the broad fields of agricultural productions and marketing, rural development, home economics and youth development.	A,C,E,F, Formula grants	Smith Lever Act as amended, District of Columbia Act of 1968, Rural Development Act of 1972	5.7 mill. estimated spent on Energy Education	Grants are made to designated land grant institutions in the states. Administered by the director of the State extension service. Benefits the general public.	State Extension service office, land-grant universities. In D.C.: Dr. Glenda Pifer, Cooperative Extension Service, USDA, Wash., D.C. 20250 202-447-2179	10.881
Youth Conservation Corps–Grants to States	To accomplish needed conservation on public lands, provide gainful employment for 15 through 18 year old males and females from all social, economic, ethnic and racial classifications, develop an understanding and appreciation in participating youths of the Nation's natural environment and heritage.	E,G, Formula grants	Youth Conservation Corps Act of 1970. PL 93-378, 93-408	average grant per state is 100,000	All states are eligible. Participants must have attained the age of 15 but not attained the age of 19, be permanent residents of the U.S. or its territories, be employed for a period of not more than 90 days in any calendar year, be employed without regard to their sex or social economic or racial classification.	Regional or local offices, State Foresters or Directors of Department of Natural Resources are also sources of information. In D.C.: Staff Director, Human Resource Programs, Forest Service, USDA, Wash., D.C. 20250 202-342-5951	10.661
Agency: Department of Commerce							
Economic Development–Technical Assistance	To provide management and technical assistance services to businesses, communities and development organizations. Develop training materials in solar energy equipping for buildings and energy conservation for businesses.	A,C,E, grants, schools get grants from the Economic Development Administration to run the Centers.	Technical Assistance–Title III of the Economic Development Act.	3 mill. funding 28 centers in 1979.	Universities apply for Center grants Public may contact schools for information concerning the centers' activities	Regional EDA offices In D.C.: Glen Fatzinger, Economic Development Administration, DOC, Wash., D.C. 20230	11.303

STATE AND LOCAL RESOURCES

In general, state funding resources are limited compared to federal resources and, where they exist, are specific enough to each state to make a comprehensive list of possible state resources too unwieldly to list here. Because of these difficulties, the following information covers just those general sources at the state level from which more state-level information may be obtained.

Within the state, the Office of the Governor can usually provide referrals to potential funding sources. In some states, CETA regulations permit the set-aside of a percentage of the total CETA state grant to be used by the Governor for funding special discretionary projects. In California, for example, Governor's Discretionary Funds have been used to develop solar training and other energy projects. The State Department of Energy may be interested in low-income energy education programs or already conduct them, or a State Office of Appropriate Technology, if one exists (as in California and Massachusetts), might be a source. Often State Departments of Education have energy education departments or money which can be used for summer teacher workshops or other instructional purposes. In Nebraska, a CAA persuaded the State Board of Education to run a series of summer workshops on energy education. State Energy Extension Services may also be possibilities, as noted above. Occasionally, State Councils of the Humanities, where they exist, may serve as funding sources for projects dealing on the humanist level, for example, with value/ethical choice questions about our energy future.

In general, to discover possibilities for funding on the state level or interest state officials in such programs, it might be helpful to look for state programs which are similar to those federal programs mentioned earlier, or which have similar target groups. For example, youth, vocational, public education, volunteer, employment, senior citizens, and other programs on the state level might provide sources of funding.

Local funding possibilities are often more limited than even the state projects. Occasionally, an area may have a county-level office of appropriate technology, as in Lane County, Oregon, which may serve as a possibility. In large cities, city departments similar in subject area to those federal and state departments referred to before might be possibilities. In Chicago, for example, the City Office of Senior Citizens provided some of the funding for a greenhouse project involving both seniors and young people. In smaller areas, sometimes a local government can be persuaded to set aside its own tax money for energy education projects of benefit to the whole community. In Somersworth, New Hampshire, the town council supported an effort by the High School Vocational Program to build a solar-heated firehouse.

From: Energy Education Guidebook, CSA, 1980

It must be stressed, however, that, because state and local resources are limited, only in rare cases will they provide more than supplementary funding to federal grants. Nevertheless, in an environment in which federal efforts are shrinking or subject to sudden cutoffs, the project that has many sources of funding has the best chance of survival.

PRIVATE FUNDING SOURCES

1. Foundations

Private foundations, by and large, are a funding source which, though potentially promising, has not been used very much by energy education programs. Several foundations exist, however, which may be plausible sources of funding for community organizing and youth projects around energy. For further information, send two dollars to the Center for Renewable Resources, 1028 Connecticut Avenue, N.W., Suite 1100, Washington, DC 20036, for Sources of Funds for Solar Activists, by Anita Gunn. Another good source of information is the 1977 Network of Change-Oriented Foundations, compiled by the Playboy Foundation, 919 N. Michigan Avenue, Chicago, IL 60611. How to Apply to a Foundation (Report Series No. 50) contains a fine short description of how to write a proposal most effectively, and a good list of foundations to contact. Send $0.60 to Citizens' Energy Project, 1110 Sixth Street, N.W., Suite 300, Washington, DC 20001, or call 202/387-8998.

2. Utilities, Corporations, Unions, and Other Organizations

On occasion, private organizations have provided some funding for energy education programs. In some states, more often in the West, public utilities have funded parts of energy education programs. Usually such utilities are owned by some branch of government, or have been subjected to political pressure by government or lobbying groups, or are in rare instances sympathetic.

Private corporations sometimes donate money to community-based programs. McDonald's, for example, donated $3,500 to the Christian Action Ministry Greenhouse in Chicago. Oil companies, like Exxon or Mobil, sometimes contribute to energy education programs. Response from programs holding Exxon grants indicates that few if any strings are attached to the money; in other words, recipients do not have to teach Exxon's point of view.

Labor unions represent an almost completely untried source of funds for such programs. You should search out union locals or offices in your area to see what possibilities exist.

Local service clubs like Lions or Rotary are possible sources of support for energy education efforts. They often donate money to support new community projects, provide sponsorship and/or volunteers for events like energy fairs (serving as exhibit judges, directing traffic, selling tickets, etc.), and encourage their members who are local businessmen to cooperate by donating materials. Most service clubs in smaller cities actively seek out new community service projects.

V. A Selected "How-To"

Since "do-it-yourself" seems to be the slogan of energy conservationists, we include in this section a sample of the wealth of material available to student volunteer programs interested in getting involved in energy-related activities. Whether you decide to tackle a weatherization project or construct a solar greenhouse, there are a great many inexpensive and helpful resources available to guide you.

We have referenced booklets, pamphlets, and how-to guides in the Resources Bibliography.

Publication Number O15

Caulking:

the PUSH METHOD for Fast, Simple Caulking

January 1978

Because of the national concern about the energy crisis and high fuel bills, people are increasingly interested in things they can do to "weatherize" their homes. The following method of applying caulking is simple, easy, and more effective than the conventional methods of application. Materials needed include the following items: caulking gun, caulking, a sharp knife and a solid cutting surface. However, before beginning with the first step shown in Figure 1, refer to *"surface preparation instructions"* on the caulking tube.

An even, smooth caulking surface results when you use this easy, push-caulking technique. This method eliminates having to go over the surface with your fingers to touch up any bumps. After you get started, you'll probably discover that it is faster to push the caulking along the surface when you can see where the bead is going. Ease of application and surface appearance are two advantages of this approach; the third is in the thorough application that results from the pushing pressure that forces the caulking compound into the crack. A few tips like this one can save you time and improve the quality of your work when you begin "weatherizing" your home.

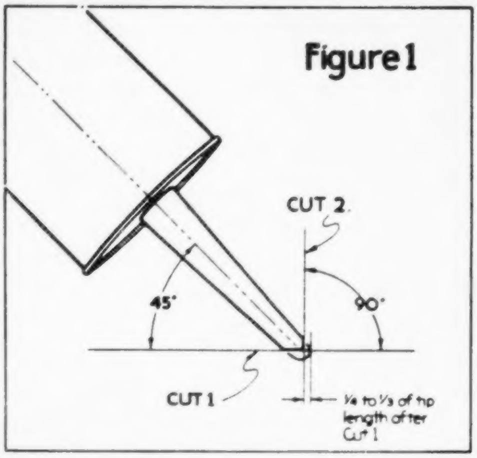


Figure 1

Figure 1.

1. Place the caulking tube nozzle on a suitable cutting surface for cuts # 1 and # 2.

2. Using a sharp knife, make cut # 1 on the nozzle at 45-degrees off horizontal. The amount of the nozzle to be removed depends on the size of the bead needed. Start with a small cut and increase the size later, if you wish.

3. Make cut # 2 perpendicular to cut # 1 at approximately one-fourth to one-third from the front end of cut # 1.

4. Puncture the nozzle diaphragm with a nail.

5. Insert caulking tube into gun. Push plunger forward with ratchet teeth down, and rotate tube with cut # 1 facing down toward the handle.

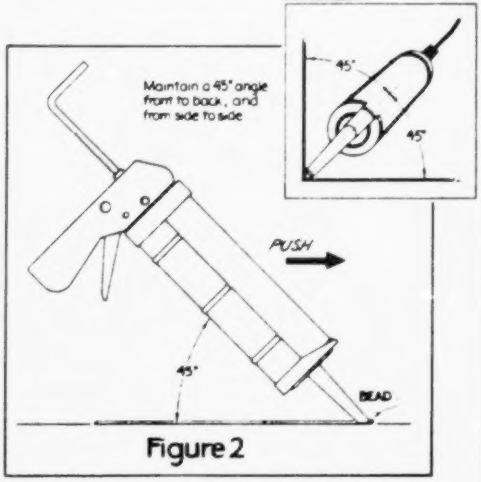


Figure 2

Figure 2.

6. With one hand on the barrel and the other hand on the controlling trigger handle, position with cut # 1 as shown.

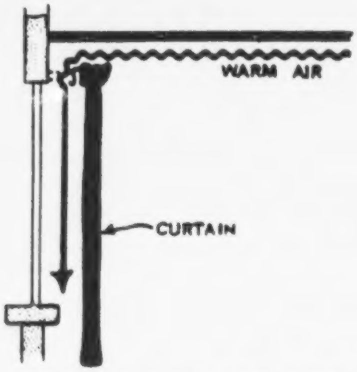
7. Gently squeeze the trigger, watching the nozzle tip for the initial bead. Push the gun **forward** *while constantly observing and maintaining front bead size. (The bead serves as a guide that proper speed and quality is being maintained.) At no time should the front bead become larger than the nozzle tip width. If the front bead is not visible, slow down the forward movement and/or exert more trigger pressure.*

8. To stop bead, release pressure on the trigger. Turn plunger, disengaging the ratchet teeth, thus relieving pressure. Then twist gun slightly and/or push the gun forward and remove from surface.

Prepared by NATIONAL CENTER for APPROPRIATE TECHNOLOGY
P O Box 3838 Butte, Montana 59701 Phone 406-723-5474

MAKE A GOOD WINDOW CURTAIN

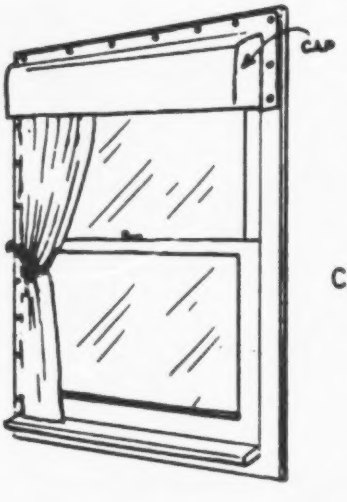
Good window curtains will help you save money, and help keep your home warm and comfortable, too. They reflect heat back into the house and keep warm air away from the cold windows. To do this, the curtain must be tight at the top, bottom, and sides! Otherwise, the warm air at the ceiling will move down the walls and windows as it cools. So button up the curtain on all sides and you will have a great heat-saver.



AIR IN CONTACT WITH WINDOW LOSES HEAT

The curtain should also be light-colored, to reflect back more light and heat into the room. The curtain material should be thick enough so air can't go through it easily. A bed-sheet would be too lightweight and would let air pass through, but an old wool blanket would be fine. Your curtain will insulate better and save even more heat if you sew a curtain liner to the blanket. Or, if you have an old quilted comforter, use that.

You can make your own curtain, and cheaply too. Make it so that it seals air out of the top, sides, and bottom when it is closed. Here is the way to do it. To make the top "cap" for the curtain, attach a piece of material to the window frame several inches above the curtain rod area. It should drape over the top of the curtain all the way around. Cut the material so there are no "ruffles". The cap should lie flat on top of the curtain to make a good air seal. Also, when you tack the cap to the window frame, make sure it seals well.



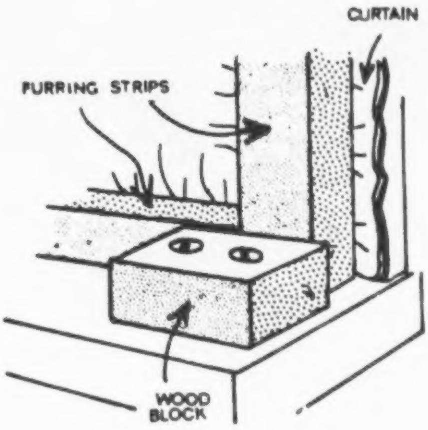
CAP YOUR WINDOW TO SAVE HEAT

Tack one side of the curtain to the window frame to make it airtight. On sunny winter days the curtain can be pulled and tied to this side. Tie it above center, as this clears more of the window to let light in. The curtain must slide along the rod to do this, so make sure it can move. Little rope loops will be fine. Also, make sure the curtain rod is smooth and round so the curtain can slide easily.

When you pull the curtain across the window at the end of the day, there will still be a space on the bottom and on the other side where air can get next to the window and cool down. If you want to keep in the most

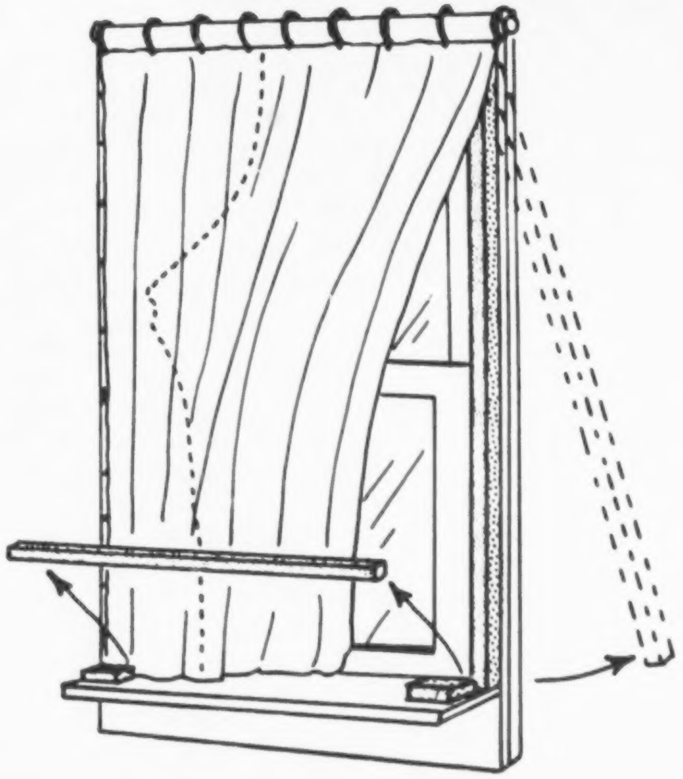
From: Save Energy: Save Money, CSA, 1977 warmth with your curtain, you have to make a tight seal here too. This can be done simply, with wood screws and sturdy lumber yard "furring strips." The furring strips hold the curtain against the window frame, using two wood blocks as in the picture. Adjust the blocks so that the curtain is just tight enough against the window frame to give a good air seal. You have only to pull the furring strips to one side to move the curtain.

This kind of curtain will really reduce your heating bill. In summer, use it to trap heat at the window and help keep your house cool. Just open the window a bit at the top and bottom, and the closed curtain will block the sun and keep the hot air next to the window where it can escape to the outdoors.



STRIPS SWING BACK TO HOLD CURTAIN TIGHT

STRIPS SWING OUT TO RELEASE CURTAIN
(WINDOW SHOWN WITHOUT CURTAIN CAP)



Remember: Use the winter sun when you can. Close off curtains at night and keep the heat in your house. Whatever you spend on materials to make good curtains, as described above, will come back to you in one or two winters as money saved on heating bills. In the summer you can also use curtains to help keep the sun out.

15. SOLAR HEATED GREENHOUSE

Complexity Level: III

Who Can Do It?

This activity can be an exciting class project and a worthwhile solar heating and food production addition to the home. If undertaken by a class and/or CAA, it will often attract community interest through the news media. Some carpentry skill is involved and it would be advisable to contact someone early in the activities development with woodworking experience.

Material Costs

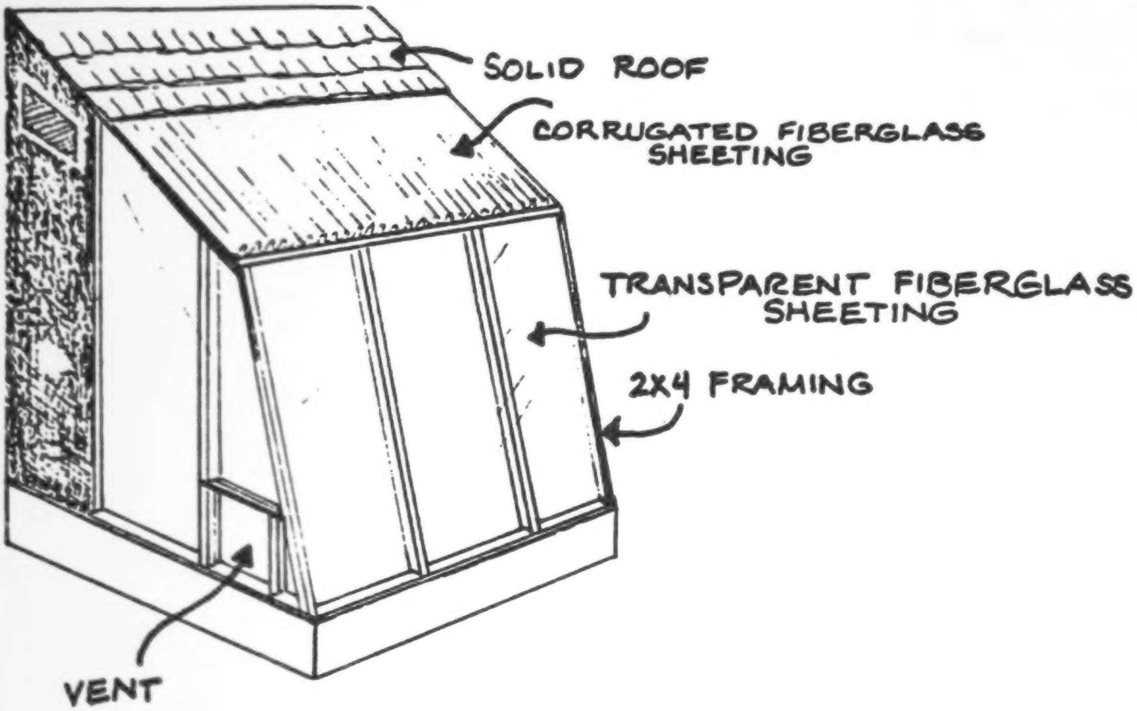
Costs range from $3.00 per square foot to $5.00 per square foot of greenhouse floor area. Thus, a 10-feet-long-by-10-feet-wide greenhouse (100 square feet) will cost between $300 and $500 to construct. Although this is somewhat expensive, the greenhouse can in some cases provide supplementary heat to a home. Basically, a greenhouse is a very large solar collector, and a lean-to greenhouse can be designed so that solar heated air generated in the greenhouse is vented into the home. The cost of a hand-built greenhouse is roughly equivalent to that of a hand-built solar collector on a square foot basis. That is, a hand-built solar collector designed to be durable (lifetime - 20 years) will cost between $4-5 per square foot as will a greenhouse ($4-5 per square foot of enclosed space).

Time to Completion

If the activity is properly organized and the construction tasks are well defined, it is possible to construct a 100-square-foot greenhouse in two weekends. However, it would be wise to plan for such an activity over a 4- to 5-month time span. Planning the structural design, purchasing the materials, and finding the proper tools and equipment all take time. For example, if fiberglass is ordered as the glazing/covering for the greenhouse, it can take up to 1 month or more to receive the shipment. Unexpected delays are a common occurrence in a project of this size. Be flexible in your time-table.

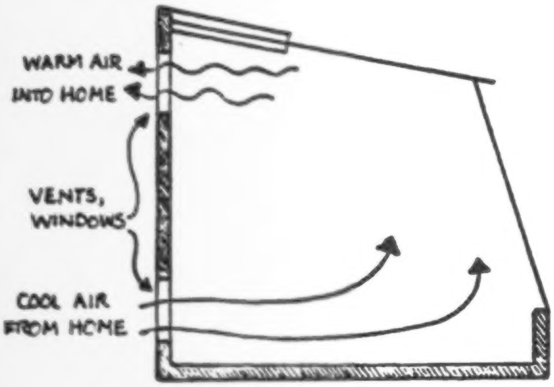
From: Energy Education Guidebook, CSA, 1980

SOLAR HEATED GREENHOUSE

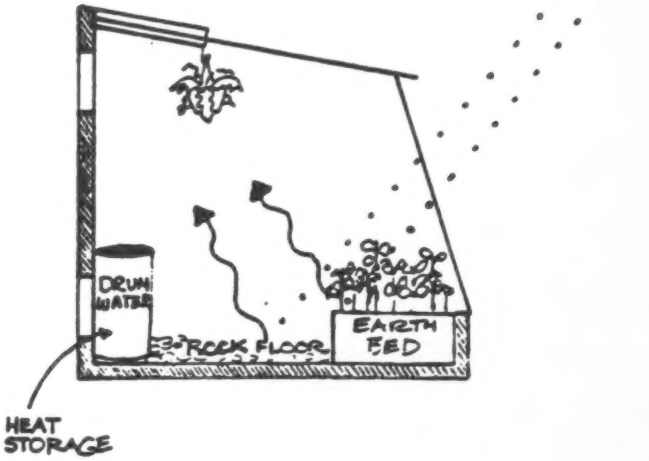

SOLID ROOF
CORRUGATED FIBERGLASS SHEETING
TRANSPARENT FIBERGLASS SHEETING
2X4 FRAMING
VENT

VIEW FROM SOUTH

GREENHOUSE AS SOLAR COLLECTOR


WARM AIR INTO HOME
VENTS, WINDOWS
COOL AIR FROM HOME

THERMAL STORAGE IN A SOLAR GREENHOUSE


DRUM WATER
ROCK FLOOR
EARTH BED
HEAT STORAGE

Advantages

As an environment to grow vegetables, a solar greenhouse can serve as a classroom setting for various biological experiments such as measuring plant growth versus light intensity. Also, cool weather crops can usually be grown throughout the winter in a solar greenhouse without any supplemental heating of the structure.

Procedure

There are a number of descriptive books and booklets which are now available on solar greenhouse design and construction. Several of these texts are included in the references section.

Before the actual design and construction of the greenhouse, some preliminary planning steps could be initiated. Students can be asked to build their own models for a greenhouse out of cardboard and clear plastic food wrap. The first model might be a cardboard box with a window in one side. Later, more sophisticated cardboard models could be built as complex design concepts are introduced into class discussions.

The principles of heat flow, heat equilibrium, insulation, and heat conductivity outlined in the shoe-box solar collector project (No. 1)* and the testing insulative materials project (No. 5)* would serve as a sound fundamental beginning for the future planning of the solar greenhouse. The models can also be discussed in terms of heat loss areas, solar heat gain areas, ways of shading the model (deciduous plants, eaves), heat storage systems (water, rocks, earth), the compass direction the greenhouse is facing (north, south), ways of venting hot air from the greenhouse into a house, ways of insulating the greenhouse glazing at night, the surface area of the greenhouse versus the volume it encloses, and material costs and durability. Through the use of models and class evaluations of the different designs, the students should be able to suggest the best design for the solar greenhouse.

Once a general design has been settled on, the students can then be asked to begin design of the wood framework for the greenhouse, deciding as to the materials they need and perhaps even ordering those materials. It would be helpful to bring a vo-tech instructor or an individual with carpentry experience into the process to provide suggestions and guide the students as they plan the greenhouse construction.

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*Both projects are detailed in their entirety in the publication from which this was excerpted, the Energy Education Guidebook, available from the Community Services Administration, (See the Resources Bibliography for details)

Variations on the Same Theme

On-site visits of solar greenhouses that have already been constructed would be a very valuable learning experience for a class that is about to build their own greenhouse.

After the greenhouse is completed, class records of the thermal characteristics of the greenhouse are an important extension of the greenhouse as an energy education project. For example, air temperature records in the greenhouse at various heights should prove that hot air rises and stratifies. Temperature measurements of the walls, floor, and glazing should indicate which areas are losing heat more rapidly. If rocks or water are used for heat storage, a temperature record of their performance over time should indicate how much heat is stored or emitted. (This would be subject matter for a physics course, or the physics teacher could be invited to the class to provide advice).

A number of educational institutions have built solar greenhouses successfully and have involved children at the sixth-grade level in the project, proving both the unskilled and semi-skilled can be involved in a project of this complexity.

References

An Attached Solar Greenhouse by Bill Yanda and Susan Yanda. Available from Lightning Tree Press, Santa Fe, NM 87501.

Community Action of Laramie County, Wyoming has a 15-minute slide show with audio available on how a solar greenhouse was organized and built. Interviews with participants are included in the audio portion. The slide show can be rented for $30.00. Contact Mr. Gary Garber for more information at: Community Action of Laramie County, 1603 Central, Number 400, Cheyenne, WY 82001 (307/635-1909).

Low-Cost, Energy-Efficient Shelter for the Owner and Builder by Eugene Eccli (ed.), 1976 (600 pages), Rodale Press, Emmaus, PA 18049, $5.95. See chapter on solar greenhouses by Ronald Alward.

Solar Heated Greenhouses (special edition) by Alternative Sources of Energy (Feb/March 1979), (56 pages), Rt. 2, Box 90A, Milaca, MN 56353, $2.00. Extremely informative edition of solar greenhouse design and development.

Solar Greenhouse Digest, Inc., P.O. Box 3218, Kingman, AZ 86401, $7.00 per year. Periodical on greenhouse design.

The Food and Heat Producing Solar Greenhouse by Rick Fisher and Bill Yanda (1977). Available from John Muir Publications, Box 613, Santa Fe, NM 87501, $6.50. Many greenhouses are pictured and described.

The Solar Greenhouse Book by James C. McCullah (ed.), 1978. Available from Rodale Press, Emmaus, PA 18049, $8.95. Very comprehensive book discussing heat gain, heat storage, orientation of greenhouse, etc.

The Survival Greenhouse by James De Korne, 1975. Available from The Walden Foundation, El Rito, MN. A pit or sunken greenhouse design.

Vocational Region 10 Solar Greenhouse: A Resource Booklet for Vocational Educators by the Maine Audobon Society, 1979. Available from Maine Audubon Society, 118 Old Route One, Falmouth, ME 04105, $4.50. A description of a vocational education project where a solar-heated greenhouse was designed and constructed by students.

Energy-Saving Checklist for Home Builders, Buyers, and Owners

This checklist contains many items that you should consider when building, renovating, or improving the energy efficiency of your home.

Building Shell	Yes	No	NA
1. Are storm windows and storm doors installed?			
2. Are window panes and frames properly caulked? Do windows open for natural ventilation?			
3. Are exterior doors weatherstripped? Are door frames caulked?			
4. Are ceilings and walls insulated to the highest level recommended for your geographic location?			
5. Does the home have a vapor barrier in the walls to prevent water vapor from passing through and condensing into the insulation?			
6. Are floors insulated over unheated basements, crawl spaces, and garages?			
7. Do basement walls contain 2" x 2" furring with R-7 insulation?			
8. Have you considered 6" walls with studs on 24" centers to allow maximum space for insulation?			
9. Has a clock thermostat been installed to reduce, automatically, evening temperatures?			
10. In colder climates, is window space on the north side of the house at a minimum?			
11. Is the home efficiently shaped to limit heat loss, avoiding L-, T-, and H-shaped configurations?			
12. Does the house have an overhang for the south wall which will protect it from summer sun, but allow exposure to winter sun?			
13. Does the fireplace have a heat exchanger to collect unused heat?			
14. Is the fireplace a high-efficiency type with a tight damper?			
15. Is fluorescent rather than incandescent lighting used in the kitchen and bathroom?			
16. Are outdoor gas lamps essential for safety or merely decorative?			
17. Does the landscaping shade the house in summer and let in winter sun?			
Appliances			
1. Do appliances have the highest Energy Efficiency Rating?			

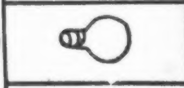
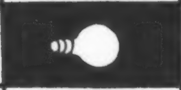
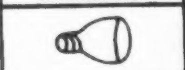
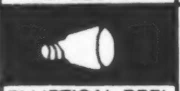
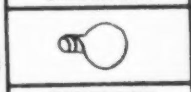
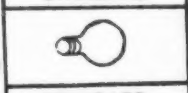
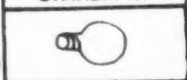
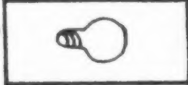
	Yes	No	NA
2. Is the hot water heater well insulated? Is the water temperature at a reasonably low level?			

Heating, Ventilating, and Air Conditioning

	Yes	No	NA
1. Are hot water pipes or hot air ducts insulated in unheated passages?			
2. Are air leaks in ductwork sealed?			
3. Are exposed hot water pipes and hot water storage tank insulated to reduce heat loss?			
4. Have you considered a heat-recovery pipe which preheats outside air with exhaust air from the ventilation system?			
5. Are window or whole-house ventilating fans adequate for comfort?			
6. If home has air-conditioning units or a central compressor, are they shaded from the sun to increase efficiency and reduce energy use?			
7. Does cooling equipment have the highest Energy Efficiency Rating?			
8. Is cooling equipment the smallest size possible to do the job adequately?			
9. Is the heating system the most efficient? Is it the appropriate size? Oversized systems waste a great deal of energy. Is the oil furnace serviced regularly?			
10. Do heating and cooling systems provide for continuous fan operation, which often provides comfort without using the full system capacity?			
11. Does the attic have 1 square foot of ventilation for each 300 square feet of ceiling? This reduces the air-conditioning load, and should be done even with insulation having a vapor barrier in the ceiling.			
12. Have fuel costs and supplies been evaluated to select equipment and fuel on a lifetime cost efficiency basis?			

U.S. Department of Energy
Editorial Services, 8G031
Office of Public Affairs
Washington, D.C. 20585

7 Ways to Save Money with Incandescent Lighting

	WHERE YOU NOW USE	CHANGE TO THIS	COMMENTS	INITIAL INVESTMENT Suggested list less 40%	ANNUAL ENERGY SAVINGS @ 4¢/KWH			PAYBACK*** @ 4000 HR/YR
					2500 HR/YR	4000 HR/YR	7500 HR/YR	
1	 STANDARD	 KRYPTON	Direct substitution is permitted. Krypton filled lamps are available in sizes to replace from 40 to 150 watt standard long-life bulbs. Calculations were made for the change from a standard 60 watt to a 54 watt krypton lamp	100 lamps* @ 54¢ $54	$60	$96	$180	0.6 years
2	 STANDARD	 REFLECTOR	Substitution may be performed when lamps are used in down lighting applications. The lighting level will remain close to the same. Reflector lamp lasts approximately three times as long as standard lamp	100 lamps* @ $2.06 $206	$500	$800	$1500	0.3 years
3	 STANDARD	 ELLIPTICAL REFL.	Substitution is recommended in deep-baffled down lighting. The lighting level will remain close to the same. Available in 50, 75 and 120	100 lamps* @ $2.34 $234	$750	$1200	$2250	0.2 years
4	 STANDARD	 MERCURY	In most areas of lighting application, this substitution is usually possible. Self-ballasted mercury lamps last approximately 12 times longer than standard incandescents and are available in sizes up to 1250 watts	100 lamps* @ $21.00 $2100	$400	$640	$1200	3.3 years
5	 STANDARD	 FLUORESCENT	This substitution is particularly good in office applications. The fluorescent system puts out the same light at less cost. F40 fluorescent lamps last approximately 26 times as long as standard 150 watt incandescents	50 fixtures** @ $22.00 $1100	$1110	$1776	$3330	0.6 years
6	 STANDARD	 METAL HALIDE	Metal halide lamps require a 2 to 4 minute warm-up and a 10 to 15 minute restart time before they will produce desired light. Metal halide is particularly good where high color rendition is desirable. Metal halide lasts 15 times longer	50 fixtures** @ $125 $6,250	$2900	$4640	$8700	1.3 years
7	 STANDARD	 SODIUM	High pressure sodium lamps require a three to four minute warm-up and a one minute restart time before they will produce desired light. HPS is not recommended where high color rendition is necessary. HPS lamp lasts approximately 24 times longer	35 fixtures** @ $180 $6,300	$7,150	$5,600	$21,450	1.1 years

* It is assumed that all labor will be performed by in-house personnel. Therefore, labor costs were not included in initial investment.

** Labor costs of installation included

*** In order to calculate divide initial investment by annual savings

From: Maryland Energy Saver, Maryland Energy Office, Baltimore, MD. 21204

VI. An Annotated Bibliography of Organizations

Without a doubt the Federal government is at the forefront of energy planning. Every agency has adopted an energy conservation mandate, and many are prepared to support grassroots conservation efforts with grant money and technical assistance information.

Not-for-profits and for-profits also offer the would-be conservationist a potpourri of services. As the bellweather of a conserver society, energy-oriented organizations view the current crisis as an opportunity to shape a new American ethic--a dynamic, national movement to alter energy habits. As one energy organization spokesperson put it, "It's time to reduce America's wasteline."

Therefore, the following list of organizations is an attempt to give student volunteer programs an overview of organizations, both public and private, which offer concerned citizens advice, technical assistance, and in a great many instances, money to support local energy-conscious efforts. Where appropriate, telephone numbers are included. However, street addresses and telephone numbers change arbitrarily, so we include them as a service.

Inclusion of an organization in this list does not imply that ACTION or the federal government endorses it or favors it over others not included.

FEDERAL ASSISTANCE

The Department of Energy, Technical Information Center, P.O.
Box 62, Oakridge, NT 37830

The "Godfather" of energy planning and conservation, DOE's Technical Information Center distributes films, booklets, manuals, and publications on a wide variety of energy-related topics. All materials are free of charge and there is no charge to borrow a film. A publications list and film guide are available from the Center. However, there is a three-week delivery on all materials. But never fear, the wait is worth it. The wealth of resources is overwhelming-- ranging in complexity from home energy audit guides to a final report on the feasibility of geothermal energy in Idaho.

Other DOE programs include:

Institutional Building Grants Program for Schools and Hospitals -- over the next three years approximately $950 million will be available through this programs to schools and hospitals which wish to conduct energy audits and install energy conservation/weatherization materials. All funding for this program is available through state energy offices, with a 30-30 split between hospitals and schools. Since state energy offices set priorities, DOE encourages you to contact your state office, however, if you wish a complete list of state energy offices or further information, you may write: Institutional Building Grants Program, Office of State and Local Programs, DOE, Washington, D.C. 20585

Education Programs Division - Several college-related programs are being designed by this Division, including a Faculty Development Program which will provide college or university centers with funds to conduct summer workshops in energy education for elementary, high school, and community college faculty. For more information on this program and The Materials Development Program, funding to develop and disseminate energy education materials for use in schools; and the Public Education Program, funding for civic, business and labor organizations which have already conducted national public education programs, contact the Division at the Department of Energy, 1000 Independence Avenue, S.W., Washington, D.C. 20461. Tele: 202-376-9211.

Energy Extension Service--DOE's outreach program in every state, territory, and possession. Activities include conducting learning-by-doing workshops for young people and their parents. In several states, Wyoming and Michigan included, the Service is housed on a college campus. For more information on this project, contact the Service at the Department of Energy, Washington, D.C. 20545. Tele: 202-376-4146.

Residential Conservation Service, Department of Energy.
During the next year, all public utilities will be responding to recent federal legislation which mandates that public utilities must offer customers on-site energy audits. During the months of March - June 1980, public hearings will be taking place on the local level to determine the parameters of the energy audit services the utilities should offer. Implementation of the program is expected to begin as early as October 1980 in some states, and in all states by March 1981. For those interested in more information or ways in which a volunteer project can become involved, DOE encourages you to call your local State Energy Office and asked for the person responsible for the Residential Conservation Service.

Community Services Administration, 1200 19th Street, N.W., Washington, D.C. 20036. Tele: 202-545-5420.

The Energy Division of CSA disseminates information and offers grants to local organizations which are concerned with energy conservation and how it relates to low-income and/or disadvantaged populations. Although most of their material and funding is targeted to local Community Action Agencies, a great deal of their technical assistance information is replicable. (See the Resource Bibliography for individual entries of books, manuals, etc.)

One of the projects in which student volunteers can become involved is The Energy Crisis Assistance Program. Federal funding is channelled to local CAAs for distribution to low-income households unable to meet their energy bills. CAAs are always eager to welcome volunteers to aid in crisis assistance projects, including assistance in conducting energy audits and weatherization projects. All questions on this program should be addressed to the regional CSA office, the state energy office, or the local Community Action Agency.

Department of Housing and Urban Development, 451-7th Street, S.W. Washington, D.C. 20410. Tele: 202-755-6587.

Community Development Block Grants: CDBGs are a source of supplementary funding or matching grant money for energy education programs. Only units of government at the local, county, and state levels are eligible. However, if your unit of government already has a CDBG or is preparing to apply for one, some part of the money may be used to provide stipends for school-aged youth involved in weatherizing or other housing or energy-related projects. Information about the block grants in your area may be obtained from your HUD area or Regional office or from the Office of Community Planning and Development.

U.S. Department of Transportation, Washington, D.C. 20590.

The Technology Sharing Program (202-426-4208), provides information and technical assistance on such specific transportation conservation activities as traffic flow studies and carpooling programs. A newsletter, The Energy Primer, is available free of charge and offers broad overviews of the current and projected transportation energy situation in this country. Periodic research reports on Transportation and Noise; rural transportation, and transportation for the handicapped and elderly, are also available free of charge.

The Department's Handbook for Pedestrian Action; 149 pgs., 1977; $3.50, S/N 023-000-00373-2, Superintendent of Documents, Government Printing Office, Washington, D.C. 20402, emphasizes methods for obtaining pedestrian opening that are financially and politically feasible. The information is especially useful in organizing a pedestrian street and in providing arguments for public hearings, community promotion and lobbying new laws.

ACTION, 806 Connecticut Avenue, N.W., Washington, D.C. 20525.

ACTION volunteers have long been involved in grassroots efforts to aid the poor, elderly, and disadvantaged with energy-related problems. A Compendium of ACTION Energy Projects has been prepared by the office of policy and planning and distributed to ACTION's state offices. The Compendium lists, according to program, the wide-range of energy-related services offered by volunteers both here and abroad. The descriptive examples also include contact names, telephone numbers, and highlights of the services offered. Although the Compendium is not available for general distribution, if you are interested in more detailed information on ACTION's energy-related projects, please contact the ACTION office in your state.

Energy and Education Action Center, U.S. Office of Education, Room 514,
Reporters Bldg., 300 7th Street, S.W., Washington, D.C. 20202.
202-472-7777.

The general mission of the Center is to promote all phases of energy education-related activities on the Federal, state, and local level. Besides publishing the booklet on funding excerpted in this resource package, the Center maintains a computer-tie in with the major educational associations in order to offer a data retrival information system on energy and education.

Energy-Related Invention Program, National Engineering Laboratory,
Washington, D.C. 20234.

A joint venture of the Department of Energy and the National Bureau of Standards, this program provides grants and technical assistance to energy conscious inventors. A booklet describing the eligibility criteria and a list of supplemental assistance programs for energy inventors is available free of charge by writing the program.

National Solar Heating and Cooling Information Center, P.O. Box 1607,
Rockville, MD 20850; telephone: 800-523-2929; in Pennsylvania,
800-462-4983; in Alaska and Hawaii, 800-523-4700.

Sponsored by the Department of Housing and Urban Development and the Department of Energy, the Information Center is a one-stop service facility for technical and non-technical information on any aspect of solar heating and cooling. Have a question? Give them a call. They also publish a wide variety of free materials on solar design and building. It's well worth getting on their mailing list.

Solar Research Institute, 1536 Cole Blvd., Golden, CO 80401.
Tele: 303-231-1000.

Operated by the U.S. Department of Energy's Midwest Research Institute, SERI is involved in all aspects of energy research and development. Particularly concerned with the applicability of solar energy, from its research stage to its utilization, SERI maintains a Solar Energy Information Data Bank and a Solar Energy Information Center which offers the public literature search facilities and a broad range of information on solar-related topics.

Solid Waste Retrieval System, U.S. Environmental Protection Agency, Box 2365, Rockville, MD 20852. Tele: 202-755-9157.

A major source of information and technical assistance for those initiating or operating recycling or solid waste management projects.

PRIVATE:

National Center for Appropriate Technology, P.O. Box 3838, 3040 Continental Drive, Butte, MT 48701. Tele: 406-494-4572.

An independent, non-profit corporation funded by CSA to develop and apply appropriate technologies to specific needs of low-income people and to promote locally-based programs that develop individual and community self-reliance. The Center's staff offers a comprehensive nation-wide program of technical research and assistance, small grants, information, and local support activities. To receive NCAT's grant announcements, write the Center's grants office. The Center also publishes a newsletter and a wide range of technical assistance material -- from policy studies to do-it-yourself instructions on conservation techniques.

The Citizen's Energy Project, 1413 K Street, NW, Washington, D.C. 20005.
Tele: 202-387-8998.

A non-profit research organization devoted to providing information and organizing assistance to community groups and individuals concerned with energy issues. A stamped, self-addressed envelope will bring you a free catalog of CEP's 50 publications on energy. One of the best of these resources is the extremely useful, Citizen's Energy Directory; 1978, 108 pgs. $7.50, which lists over 500 individuals, organizations, and agencies willing to provide energy-related technical assistance.

Energy Task Force, Inc., 156 Fifth Avenue, New York, NY 10010.
Tele: 212-675-1920.

This non-profit corporation provides technical and educational assistance on energy matters to low-income housing groups working to rehabilitate and revive their neighborhoods. Committed to finding the most economically viable, labor intensive, and technically appropriate energy designs for existing low-income housing, ETF has reclaimed and rehabilitated tenament buildings in inner city New York. The Task Force also disseminates how-to information, including a free booklet entitled, No Heat, No Rent, which gives a step-by-step guide for rehabilitating a low-income apartment building. Their inner city windmill power project was the subject of a government printing office publication, Windmill Power for City People (GPO-059-000-000001-2), 1977; 65 ppgs., $2.60.

Center for Renewable Resources, 1001 Connecticut Avenue, NW, Washington, D.C. 20036. Tele: 202-466-6880.

If enthusiasm and good will are any criteria for success, it is no wonder the Center has doubled its services to the public since its inception in 1978. Offering technical assistance information on solar energy and renewable resources, the Center, and its sister organization, Solar Lobby, have prepared a wealth of information on combatting the energy crisis. A free publications list is available, as well as a free booklet entitled Giving an Energy Fair. A $15 membership fee entitles you to the Solar Lobby's monthly newsletter, The Sun Times.

American Association of Community and Junior Colleges, One Dupont Circle, NW, Washington, D.C. 20036. Tele: 202-293-7050.

During the months of February, March, and April, 1980, regional AACJC coordinators sponsored a series of national issues forums entitled "Energy and the Way We Live." Using a tie-in with educational television stations and local newspaper courses, the "town meeting" seminars brought educators and concerned citizens together to discuss such topics as "Energy Self-Sufficiency and Global Interdependence." In the near future, AAJC plans to publish an overview of the results of those regional meetings on energy.

Consumer Action Now's Council on Environmental Alternatives, Inc.
355 Lexington Avenue, 16th Floor, New York, NY 10017.

Founded on Earth Day 10 years ago, the goal of CAN's Environmental Alternatives project is to raise the consciousness of consumers to the need of alterating energy habits. CAN is particularly concerned with the role of women in the new appropriate technology movement, and has sponsored several seminars for women on gaining a greater understanding of their potential impact on energy conservation. CAN welcomes inquiries and disseminates an Energy Bibliography and Directory, a Sun Day Fact Book, and an energy-related newsletter.

Environmental Action Foundation, 724 Dupont Circle Bldg., Washington, D.C. 20036. Tele: 202-659-9682.

One of the most active national utility advocacy organizations, emphasizing research and public education. This organization has an extensive knowledge of local community groups involved in utility advocacy projects and welcomes inquiries. They also publish several booklets on a citizen's guide to challenging local utility rates, and utility rate reform.

The National Center for Resource Recovery, 1211 Connecticut Avenue, NW, Washington, D.C. Tele: 202-223-6154.

Concerned with recycling and solid waste management, this organization offers technical assistance to grassroots organizations interested in initiating recycling projects. Publishers of technical assistance information, periodic bulletins, and annual reports, they also sponsor conferences and workshops.

Midland Energy Institute, 900 Grand Avenue, Kansas City, MO 64106. Tele: 816-842-2459.

A non-profit, private corporation, funded by the Community Services Administration, providing training and technical assistance in all aspects of energy-related activities to public and private organizations in the midwest. In addition to weatherization, Midland also provides assistance in energy education, design, and construction of alternative energy services. The organization also maintains an extensive energy library and a slide library of energy projects which is available for public use.

New Mexico Solar Energy Association, P.O. Box 2004, Sante Fe, New Mexico 87501. Tele: 505-983-1006.

A research and development organization, NMSA provides technical assistance in all aspects of solar energy to the southwest. Currently involved in energy education activities, the organization has sponsored a teacher training program that teaches voc/tech teachers about solar hardware construction as well as curriculum development. NSMA distributes several hands-on, how-to publications, and has an extensive slide show which is available to the public.

VII. An Annotated Bibliography of Resources

There is currently a surfeit of information on energy conservation and energy-related topics. Government agencies, state energy offices, for-profits and not-for-profits have all leapt onto the conservation bandwagon and are producing hundred's of booklets, pamphlets, and "how-tos" on energy. The following list is by no means definitive. It is selective; compiled with the hope that these inexpensive, well-written resources, will be helpful to student volunteer programs concerned with community-oriented energy conservation activities.

The starred entries are the ones which appeared in excerpted form in the text. They, like the others listed here, are available from the source, not the National Center for Service Learning. Inclusion of a resource does not imply that ACTION or the federal government endorses it or favors it over others not included.

PLANNING AND COMMUNITY ORGANIZATION STRATEGIES

*Motivation for Energy Conservation, 1980; 68 pgs.; Community Services Administration, 1200 19th Street, N.W., Washington D.C. Single copies free.

Although written specifically for local Community Action Agency personnel, this manual on motivating low-income people to alter their energy habits can be adapted by student volunteer programs. Includes guidelines for anticipating project costs and judging adequate staffing patterns.

Help Yourself! A Manual for Consumer Survival, 1978; 150 pps., Community Relations-Social Development Commission, 161 W. Wisconsin Avenue, Milwaukee, WI 53203. (Distribution limited, so please query for price and availability).

An easy to read, illustrated manual on planning a consumer education program. Several chapters are devoted to educating low-income consumers in energy conservation techniques. Some topics covered include: how to take a meter reading; how to interpet utility bills, and how to negotiate differed payments.

A Call to Action, Arizona Community Action Association, 2721 N. Central Avenue, Phoenix, AZ 85004. Free.

A 4-page booklet published as a guideline to organizing a citizens' action group for utility rate reform. Concentrating primarily on the consumers in Arizona, the booklet's premise is easily adapatable to other locales.

*Still Coping with the Energy Crisis: Preliminary Guidance on Planning for a Winter Disaster, Community Services Administration, 1200-19th Street, N.W. Washington, D.C. 20036. 1974 48 pps. Free.

Step-by-step guidelines for gearing up the low income community to cope with an impending severe winter. Includes tips on conservation/emergency weatherization; safety instructions, and formulating an energy outreach strategy as a preventative measure.

A Community Project in Alternative Energy: Epoch B, 1978; 112ppgs. Epoch B., Evanston Environmental Association, 2024 McCormick Blvd., Evanstan, Ill. 60201; $3.50.

Documents the efforts of a group of energy conscious citizens in Evanston, Ill, who championed a full-fledged, community scale program to address many of the energy conservation issues. Organization and technical appendices constitute over half the book and give in-depth information on financing energy conservation and solar workshops; grant and in-kind materials, and professional services; fund-raising and planning programs around weatherization and energy audits.

Saving Home Energy: A Handbook for Organizing a Hands-On Energy Conservation and Passive Solar Energy Workshop; 1977, 58 ppgs., Colorado Solar Energy Association, P.O. Box 5272, Denver, Co. 80217. Price: $3.95 + 75¢ shipping and handling.

A step-by step guide to planning and implementing a workshop on energy conservation. Workshop planning focuses on defining an audience, limiting the subject scope, and organizing and assigning committee responsibilities. Includes samples of press releases, workshop questionnaires, and post-conference evaluation forms.

*Community Planning for Home Heating Emergencies, 1979; 72 pgs; Community Services Administration, 1220 19th Street, N.W., Washington, D.C. 20036. Free.

Strategies for preventing home heating crises. And, if a home heating crisis is unavoidable, strategies for easing the situation and reaching the low-income and elderly.

A Community Guide to Weatherization, 1979; 37 pgs., Community Services Administration, 1200-19th Street, N.W., Washington, D.C. 20036. Free.

How to establish a grassroots, cost-effective weatherization program.

*Reaching Up; Reaching Out, 1978; 208 pgs, GPO-061-000-00345-2, Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. $6.00.

A comprehensive guide to organizing and implementing grassroots energy-related events. Divided into three sections, this book offers case studies of 15 successful alternative energy projects; an organizing primer, which provides key elements for organizing community groups, and an extensive bibliographic guide.

ENERGY & EDUCATION: Teaching Energy Conservation

Solar Curriculum for Grades 7-12, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

During 1979 the U.S. Department of Energy sponsored a curriculum development project on solar energy which resulted in materials for classroom use designed to integrated into existing science courses. All materials were extensively field tested before publication, and a Teacher's Guide was developed. The curriculum units in the series include:

#061-000-00228-6:	Activities:	Junior High Science	$2.75
-00229-4	"	Chemistry & Biology	$2.20
00230-8	"	Biology	$1.70
00231-6	"	General Solar Topics	$2.50
00232-4	"	Earth Science	$2.75
00-00233-2		Solar Energy Text	$2.75
00234-1	Solar Energy	Teacher's Guide	$2.20
00235-0	Solar Energy	Reader	$2.75

The New Western Energy Show, 435 Stapleton Building, Billings, MT. 59101

A curriculum which emphasizes the need for the arts, particularly drama, music and dance, to become involved in disseminating the energy message. The organization which designed the curriculum is in the process of compiling additional materials and hopes to be able to disseminate copies of their interdisciplinary energy curriculum in the near future.

Solar Energy Education Packet for Elementary and Secondary Students, 1979; 60 pages; SUNDRIES, 1001 Connecticut Avenue, N.W., Washington, D.C. 20036. Price: $3.75.

An interdisciplinary selection of solar activities, reading lessons, and background materials on all forms of renewable resources--sun, wind, water, and biomass. Over 25 simple student projects demonstrate solar energy at work.

Solar Energy Education Bibliography; 1980; 60 pages, SUNDRIES, 1001 Connecticut Avenue, N.W., Washington, D.C. 20036. Price: $3.00.

A reference guide to hundreds of solar publications and audio-visual materials. The materials were selected for their value and adaptability in elementary, secondary, and college level classrooms and workshops.

Curriculum Units of Energy, Department of Energy, Technical Information Center, P. O. Box 62, Oak Ridge, TN 37830. Single copies free.

In cooperation with the National Science Teachers Association, the Department of Energy publishes the following curriculum units for infusion in current classroom courses for grades 10-12:

--Agriculture, Energy and Society

--Energy Conservation in the Home: An Energy Education/Conservation Curriculum Guide for Home Economics Teachers.

--Energy in the Global Marketplace.

--How a Bill Becomes a Law to Conserve Energy

--U.S. Energy Policy--Which Direction?

Energy & Education, the National Science Teachers Association, 1742 Connecticut Avenue, N.W., Washington, D.C. 20009. Subscription free.

A bi-monthly newsletter serving the growing number of teachers, administrators, and civic groups involved in energy education. Regular features include editorials by authorities in the fields of energy and education, listings of new, free, and inexpensive materials, book reviews, and current data on the energy situation.

*Energy Education Guidebook, 1980; 230 pgs., Community Services Administration, 1200 19th Street N.W., Washington, D.C. 20036.

An informative, carefully thought-out guide to intergrating energy conservation into the curriculum. Chapters include: Energy Education Program Models, Project Development, and Curriculum Guidelines.

FUNDING

Energy Consumer, Department of Energy, October 1979, DOE Technical Information Center, P.O. Box 62, Oakridge, Tennessee 37830. Free.

The October 1979 issue of Energy Consumer provides a detailed listing of state and regional energy-related funding assistance. A monthly publication of DOE's Office of Consumer Affairs, Energy Consumer seeks to inform the public about federal energy programs. A full subscription is available by writing DOE, Office of Consumer Affairs, Room 8E018, D.C. 20585.

*A Selected Guide to Federal Energy and Education Assistance, Energy and Education Action Center, U.S. Office of Education, Washington, D.C. 20202.

Describes energy-related assistance provided by the federal government in the areas of curriculum/materials development; direct student assistance; employee/teacher training; facilities improvement; outreach to public/business sectors, and much, much more.

Sources of Funds for Solar Activities, 1979; 130 pgs., SUNDRIES 1001 Connecticut Avenue, Washington, D.C . 20006. Price: $4.50.

A guide to approaching foundations which are receptive to renewable resource projects. Cites examples of states which have innovative funding mechanisms and includes an appendices of agency contacts.

(For more detailed information on federal assistance, please see Organizations Bibliography).

SELECTED "HOW-TOS"

*Save Energy: Save Money: 1977, 48 pages, Community Services Administration, 1200 19th Street, N.W., Washington, D.C. 20036. Free.

A simple, easy to understand guide to weatherization. Includes coping with emergencies as well as simple, passive solar projects.

The Complete Greenhouse Book: Building and Using Greenhouses from Cold Frames to Solar Structures; 1978; 380 pgs.; Garden Way Publishing Company, Charlotte, VT 05445. $8.95.

An avid gardener and an architect co-authored this book on greenhouse design and utilization. Topics include evaluating the many design alternatives available and incorporating a greenhouse into an existing structure.

Fact Sheets, The National Center for Appropriate Technology, P. O. Box 3838, Butte Montana, Free.

Periodically published, these one-page instruction sheets on energy conservation and appropriate technology are well worth getting. Also, an occasional newsletter which reports on Appropriate Technology issues.

In the Bank or Up the Chimney: 1977, 45 pages, Office of Policy Development, U. S. Housing and Urban Development, 451 7th Street, S. W., Washington, D.C. 20410. Single copies free.

A dollar and cents guide to energy saving home improvements. Includes tips and suggestions on insulation, strom windows, and calculating heat loss and conducting a home energy audit.

Harnessing the Wind for Home Energy, 1978, 132 pages, Garden-Way Publishing Company, Charlotte, VT 05445. $9.95

Provides a complete overview of wind as an alternative residential energy source. Offers guidelines for selecting sites, measuring wind power potential, and choosing wind generators for home installation.

Tips for Energy Savers; 44 pages, Department of Energy, Technical Information Center, P.O. Box 62, Oakridge, Tenn. 37830. Free

Offers practical and simple ways to save energy in the kitchen, workshops, garden and car. Includes energy-saving considerations when buying appliances and other household merchandies.

How to Build a Solar Crop Dryer; 10 pages, n. d., New Mexico Solar Energy Association, P. O. Box 20004, Santa Fe, NM 87501; $1.50.

Plans, instructions, and a list of the materials needed to build a solar food dryer, operating on natural convention. The food dryer costs approximately $60 to build.

The Fuel Savers: A Kit of Solar Ideas for Existing Homes, 1978; 60 pages; Total Environmental Action, Inc., Church Hill, Harrisville, NH 03450. $2.75.

Descrives relatively simple solar systems that can be constructed at moderate costs and do it yourself projects of varying complexities.

☆ U.S. GOVERNMENT PRINTING OFFICE:1980-330-421/6677